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THE SERUM-TREATMENT AND ITS RESULTS.¹

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AMONG the remarkable developments in medicine during the last ten years none has been more important in its practical value, nor more revolutionary in its effect on therapeutic possibilities and conceptions than the discoveries in serum-therapy. These discoveries have aroused the hope of the ultimate possibility of the production of artificial immunity to each one of the general infectious diseases of animals and man by the administration of innocuous or almost innocuous substances of bacterial origin, and there has apparently been placed almost within our grasp means for the specific treatment of many of these diseases.

The hopes earlier aroused in the minds of a few of the most enthusiastic workers in bacteriology have been more than realized in respect to diphtheria, and their most extravagant predictions have been actually exceeded by the results. The control of this disease, one of the most dreaded and fatal of diseases in modern times, has been rendered easily possible. The problems concerning diphtheria alone, however, of all the numerous and complex ones presented in bacteriologic therapy, have been completely solved so far as the practical aspects are concerned; but important contributions have been made to the solution of many others. In the study of each of these infectious diseases there are many unknown and variable factors whose determination requires most patient and painstaking investigation by methods newly worked out along new lines.

A full consideration of the present status of the serum-treatment involves the study of a large number of diseases, including diphtheria, typhoid fever, tetanus, pneumonia, streptococcus infections, cholera, yellow fever, tuberculosis, plague, leprosy, snake-venom, rinderpest, anthrax, rabies, and several other diseases of animals. The mere mention of this list shows the far-reaching effect of the epoch-making discoveries in relation to diphtheria and tetanus. Satisfactory practical results have not thus far been obtained in most of these diseases, but something has been accomplished experimentally in

all, and the scientific observations have definite value as they assist in the solution of other problems.

It was my privilege to present before the Academy in April, 1895, a paper on the antitoxin treatment of diphtheria, then in its infancy, and the results obtained from its then limited use by the Department of Health of New York City. That paper called forth violent opposition. At that time the supporters of and believers in the treatment were few in number. The majority of the profession were waiting for more information and more evidence. The past four years have supplied this in amount and character sufficiently convincing to compel the acquiescence of every intelligence, whatever may have been the previous prejudice.

I desire first to consider rather carefully the results obtained in the serum-treatment of diphtheria, primarily in this city, and then, briefly, the results in some other great cities of the world.

A report of the results of the treatment of diphtheria with antitoxic serum (not including the hospitals) under the supervision of the Department of Health of New York City, covering the period from its inauguration, January 1, 1895, to October 1, 1896, was published in the *MEDICAL NEWS* in the issues for December 12, 19, and 26, 1896. The present report is intended to complete the data up to January 1, 1899. A summary of the cases previously recorded is also included.

It may be said in an explanatory way that on January 1, 1895, the Department of Health of New York City commenced the use of diphtheria antitoxin prepared in its bacteriologic laboratories. The supply of foreign preparations at this time was limited; only a few vials of reliable antitoxia of any grade could be obtained (none was then being produced in this country) and the prices were exorbitant, averaging about 80 cents per 100 antitoxin units (Behring's standard), or from \$8 to \$12 for a dose of from one-third to one-half the size of that now generally employed. All of the preparations of serum then in use were of a low grade, and their use has long since been entirely discontinued in this city.

The serum originally prepared in the laboratories of the Department of Health was first employed in the hospitals, but as soon as a sufficient quantity was at hand, arrangements were made for its adminis-

¹ Read before the New York Academy of Medicine, March, 1899.

tration without charge (at the request of the attending physician) by inspectors detailed for this purpose to any case of diphtheria occurring in the city, and a little later arrangements were made for the free distribution of antitoxin to all public institutions and for use among those too poor to pay for the remedy; and, finally, by a special act of the Legislature, the department was authorized to sell any surplus product, the proceeds from these sales to be deposited with the Comptroller as a special antitoxin fund, subject to requisition by the Department of Health for the further production of diphtheria antitoxin, or other antitoxins, and for the expenses connected with the treatment of cases of diphtheria among the poor.

During the first period, ending October 1, 1896, 1252 cases of true diphtheria were treated by the inspectors detailed for this purpose, with 198 deaths, giving a mortality of 15.8 per cent. Of these 80 were moribund at the time of the first injection, or died within twenty-four hours after the first injection of antitoxin; deducting these, the mortality was 10 per cent. From October 1, 1896, to January 1, 1898, 1195 cases were treated, with 163 deaths, giving a mortality of 13.6 per cent. Of these 71 were moribund; deducting these, the mortality in the second series was 8.1 per cent. From January 1, 1898, to January 1, 1899, there were treated 626 cases, with 68 deaths, giving a mortality of 10.8 per cent.; deducting 21 moribund cases, the mortality was 7.7 per cent. During the whole period from January 1, 1895, to January 1, 1899, there have been treated in all 3073 cases, with 429 deaths, giving an average mortality of 13.9 per cent.; deducting 172 moribund cases, there remains a total of 2901 cases, with 257 deaths, a mortality of 8.8 per cent. In addition to these 455 cases were treated and have been excluded from the table, either because they showed on bacteriological examination no Löffler bacilli, and were not regarded as cases of true diphtheria, or were found to be cases of true diphtheria, and were transferred to the Willard Parker Hospital, and therefore passed from observation of the inspectors.

The cases referred to do not include any of those treated in the various institutions of the city or in the hospitals of the Department, and were, as a rule, among the very poorest classes in the tenement-house districts. They have, generally speaking, been under the most unfavorable conditions; have been severe cases, or regarded by the physicians in attendance as hopeless cases, and have often come under observation late in the course of the disease. In a large proportion of the whole number there was practically no other treatment besides the

administration of antitoxin. In some cases, strychnin, whisky, and other remedies were also given, but in many instances the physicians in attendance discontinued their visits after referring the cases to the Department of Health for the administration of antitoxin, as the families of the patients were too poor to pay for their attendance.

There has been from the beginning a continuous and marked improvement in the results obtained, in consequence, it is believed, of the increased experience in the use of this agent by the medical inspectors appointed to this duty, the earlier application of the treatment, the constant improvement in the character of the serum, and the larger dosage employed. During the first year the mortality among these cases was 17.9 per cent., and during the last twelve months it was 10.8 per cent., moribund cases included.

For the execution of the plan adopted for the free administration of antitoxin among the poor, the city was divided into districts, each district being placed in charge of a medical inspector, who is always on duty and liable to be called at any hour during the day or night. Requests for the administration of antitoxin are received at the office of the Department of Health from the attending physician, and immediately referred by police telegram or by telephone to the inspector in charge of the district in which the case occurs.

In a large majority of all cases treated only one injection of antitoxin was administered; in all severe cases since the end of the first year of the work the initial dose was large, varying from 2000 to 4000 units, experience showing that the best results were obtained from large initial doses, and the tendency has been to constantly increase the size of this dose. This experience is in direct confirmation of the conclusions reached in the experimental investigations on animals. As a rule, the patients were seen a second time at the end of 24 hours, and when it was considered necessary a second injection was then administered. They were afterward seen at intervals as seemed necessary, until the disease had terminated either in complete convalescence or death.

The serum employed has been generally of high grade, varying from 300 to 800 or more units in each c.c. Better results have been obtained with the use of high-grade preparations and with larger doses of antitoxin. In the earlier months, when large quantities of serum were administered, the serum containing proportionately less antitoxin, rashes were of frequent occurrence, and their frequency varied with different preparations obtained from different animals; but no reliable data as to the

percentage of cases in which they appeared are at command. There has been a marked diminution in the frequency with which rashes have occurred and in their severity since the use of the higher grade preparations, in which smaller doses of serum are employed. No case has come under observation in which any permanent injury could be properly attributed to the remedy.

The data as regards complications are incomplete, as in the class of patients treated—often the most ignorant of the foreign-born population under the conditions existing in the poorest tenement-houses—careful observations could not be made. In many instances, serious complications independent of diphtheria, such as scarlet fever, measles, and whooping-cough, acted as contributing or determining causes of death in the fatal cases—all such have been included. In all, with few exceptions, in which the clinical features were unmistakable, the clinical diagnosis was confirmed by bacteriological examination. In a few instances the result of the bacteriological examination was indecisive, while the case was evidently diphtheria, and these have been included. In others, bacteriological examinations showed clearly that the cases were false diphtheria, and all such have been excluded from the list. The usual practice has been, when a case was seen for the first time by the inspector (at the request of the attending physician), to administer an injection of antitoxin, if the disease seemed clinically to be diphtheria, and at the same time to make a culture from the throat for bacteriological examination, if a culture had not been previously made. The course subsequently pursued in each instance depended upon the results of the bacteriological examination.

When cases of diphtheria were seen in families in which there were other children, who had been exposed to the disease and when the parents would allow it, an immunizing injection was administered to each of the children and often to the adult members of the family. In most instances, recently, after immunizing injections have been administered, no attempt has been made to separate the case of diphtheria from the well members of the family, as experience showed that such separation was unnecessary. Altogether 5108 persons in tenement-houses have been immunized, from 200 to 800 antitoxin units being administered to each person. These persons were members of nearly 2000 different families, and among them there occurred within 24 hours 26 cases of diphtheria, of which one only—a patient with croup—died. Undoubtedly in these persons, the disease was already developing at the time of the administration of the antitoxin, and the amount administered—an immunizing dose—was not sufficient

to completely check the disease. After 24 hours, and within 30 days, 23 cases occurred. All of these patients recovered with the exception of 1, who developed *scarlatina* and *diphtheria* on the second day after the immunization. This child died. After 30 days, so far as is known, 7 cases occurred, of whom two died, one on the 36th, and one on the 55th day, respectively, after the administration of the immunizing dose. In other words, in 5108 persons immunized in about 2000 families 4 deaths subsequently occurred—one from croup, which developed within 24 hours; one from *scarlatina* and *diphtheria*, which developed on the second day, and 2 from *diphtheria*, which developed, 1 on the 36th, and the other on the 55th day of the disease. The data regarding the occurrence of cases of *diphtheria* among those immunized after 30 days are probably not complete, as many of these cases were not subsequently followed.

The experience of the inspectors with immunization is quite in accord with that obtained from the immunization of children in various institutions in this city and elsewhere, and indicates that the protective influence of the immunizing injections can generally be depended upon to last from three to four weeks, although in many cases the period is apparently longer. The results have been better since somewhat larger doses have been administered. With the high-grade preparations of antitoxin now employed the amount of serum required for an immunizing injection is so small—varying from 5 to 15 minims according to the age of the patient and the strength of the preparation—as to be entirely unobjectionable. In the earlier work, when young and feeble infants were immunized, some restlessness, accompanied by more or less pyrexia, occurred in many cases during the first twenty-four hours, and not infrequently a rash appeared later.

The accompanying tables, I., II., III., IV., and V., give more complete data concerning the cases of *diphtheria* treated with antitoxin by the Department of Health Inspectors, January 1, 1895, to January 1, 1899.

I have also prepared a table showing the absolute number of deaths annually and the death-rates per 100,000 population from *diphtheria* and *croup* in several of the large cities of the world, notably, Paris, Berlin, and New York, where *diphtheria* antitoxic serum has been generally employed, which gives most striking testimony of the value of this remedy. In each of these great cities the death-rate has been reduced to less than one-half of the lowest death-rate recorded previous to 1894. In Paris the rate is about 30 per cent., and in New York about 29 per cent. of the rate for 1894. In

1894 there were 2870 deaths from diphtheria and croup in New York City; pneumonia and tuberculosis only exceeding diphtheria and croup in the number of deaths caused. In 1898 the deaths were 923; the number of cases of diphtheria and croup reported in 1898 is also below the number for any year since 1893, and the case fatality is lower, being 12.2 per cent., as contrasted with 40 per cent. for 1892, 36.4 for 1893, and 29.7 for 1894. The diminution in the actual number of deaths and the diminution in the death-rate per 100,000 population since 1894 has been greater in New York City than in any other great city in the world.

These data are in striking contrast with the conditions in London, where diphtheria antitoxic serum has been used to a very limited extent outside of the hospitals of the Metropolitan Asylums Board. While there has been some reduction in the number of deaths from diphtheria in London since 1893, it is inconsiderable. The present mortality is still greater than that in London previous to 1894, and is in great contrast with the reductions which have taken place in other great cities. Previous to 1894 there had been a very great increase in London in the notifications of diphtheria and croup and the deaths from these diseases. In 1893 there were the greatest number of deaths ever recorded—3484. Cobbett in a recent article has carefully analyzed the conditions, and has ascribed the difference in the results obtained with reference to this disease in London and on the Continent to several causes: 1st, the increasing prevalence of the disease in London in recent years; 2d, the severe type prevailing; 3d, the poor quality of the serum; 4th, the much less extensive use of the serum.

Dr. Goodall, however, commenting on the statistics given by Cobbett and the results of his calculations, gives the following table showing the percentage mortality of all cases of diphtheria in London City and in the Metropolitan Asylums Board hospitals since 1892:

	1892	1893	1894	1895	1896	1897
Fatality per cent. of all notified cases.....	23.8	24.5	24.7	21.2	19.4	17.4
Fatality per cent. of all notified cases admitted to M. A. B. Hospitals.....	24.8	27.1	25.5	18.3	17.7	14.9
Fatality per cent. of all notified cases not admitted to M. A. B. Hospitals.....	21.5	23.7	24.5	23.3	21.3	20.1
Percentage of notified cases admitted to M. A. B. Hospitals.....	31.1	24.5	38.8	41.5	39.9	51.4

"This table," Goodall remarks, "shows, but more emphatically than Cobbett's tables, that

whereas the fatality of hospital-treated cases was up to 1894 greater than that for the whole of London, since that year the reverse has been the case. It also shows that the improvement in the fatality-rate is more marked in the hospital cases than in those not admitted to hospitals. It further shows that there has been some improvement in the fatality of cases not admitted to hospital. It is very uncertain that the improvement in these last cases is due to the use of antitoxin. Doubtless some cases are admitted to the general hospitals and are treated in them with serum. Possibly the improvement may be due to this fact; but, if so, it only emphasizes Cobbett's statement, to the effect that outside of hospitals the antitoxin treatment is little employed." Goodall says that from his own experience he knows this to be the case.

A reference should also be made to the remarkable results which have attended the use of diphtheria antitoxic serum in Chicago under the supervision of the Department of Health. During the month of November, 1898, according to the reports of the Department of Health for December, 1898, 168 cases of diphtheria were reported to the Department and examined bacteriologically. Of these 98, found to be true diphtheria, were treated with antitoxin. Four cases remaining over from the preceding month were also under treatment. Of the 102 cases 97 are reported as having recovered, 2 remained under treatment, and 3 died, giving a mortality of three per cent. in completed cases. Ten of the patients treated were intubated, so that diphtheria during the month was not of a mild form. Two of the 3 deaths were intubation cases, and all 3 of the fatal cases were first seen by the inspectors of the Department later than the fourth day. To this report for the month are appended the following details of the results obtained in Chicago since the original introduction of the antitoxin treatment by the Department in October, 1895: During the succeeding twenty-six months to date, the physicians of the Department have examined 5739 cases of suspected diphtheria. Of these 3956 were found to be true and all but 134 (treated by family physicians) were treated by the Department. Out of the 3822 cases thus treated 3763 recovered and 259 died, a mortality of 6.7 per cent. Before the introduction of antitoxin the mortality-rate of diphtheria in Chicago was thirty-five per cent. "At this rate there would have been 1337 deaths among the number actually attacked instead of 259—a clear gain of 1100 lives in a space of scarcely more than two years. Besides this there were 3633 persons immunized in families exposed to infection. Only 30 out of this number were subsequently attacked by the disease; they all

had mild attacks and recovered." It is estimated by the Chicago Board of Health that in twenty-six months there has been a saving to the City of Chicago, thanks to diphtheria antitoxin, of 1713 lives.

A consideration of the deaths and the mortality per cent. in the hospitals of Paris, Berlin, and London shows the same facts as the rates for the entire cities, the number of deaths and mortality per cent. in Paris and Berlin having been reduced to a third or less, while in London the reduction has been far less and the number of cases treated has nearly doubled.

The large reduction in the number of cases of diphtheria in New York in the last year as compared with the six years immediately preceding I believe to be due to several factors: First, the general use of antitoxin and the consequent diminished severity of the cases occurring. A severe case of diphtheria is far more likely to be a source of infection to others than a mild one, especially in the tenement-house districts, because the discharges from severe cases are so much more abundant, and the difficulty in destroying them is so much greater. Second, the use of antitoxin as an immunizing agent has largely decreased the number of secondary cases. Nearly 2000 persons, mostly children (who had been exposed to diphtheria), were immunized during the last year by the Department of Health, and the remedy has also been largely used for this purpose by private physicians. Third, the introduction by the Department of Health of the medical inspection of schools, and the greater care in the inspection of cases in tenement-house districts have both contributed to the result.

But not only has there been a great decrease in the deaths in the great cities, but the same has been found to be true in the smaller cities of France and Germany, where this subject has been carefully investigated. In 266 German towns, with a population of over 15,000, for nine years preceding 1895 the average deaths per 10,000 inhabitants was 106. In 1895 this fell to 53, in 1896 to 43, and in 1897 to 35, or less than one-third of the average for nine years previous to 1894.

Sidney Martin of London, in concluding a careful report on the results obtained from the use of antitoxic serum in the University College Hospital, London, in which the death-rate is shown to have diminished from 37 and 39 per cent., respectively, in 1893 and 1894 to 17 per cent. in 1897, and the death-rate in operative laryngeal cases from 65 per cent. to 26 per cent., says "the great reduction, both in the total and in the tracheotomy mortality can only be due to the treatment with antitoxic serum, for the examination of the cases revealed no other factor capable of

producing this result." Martin recommends the use of very large initial doses, not less than 6000 normal units, and insists that it should be administered as soon as a suspicious throat is seen, without waiting for a bacteriological diagnosis of the disease. He also gives a table to show the diminished severity of the disease, and the shorter duration of the pyrexia when antitoxin is employed.

The conclusions of the Committee of the American Pediatric Society in reporting an investigation of the antitoxin treatment of laryngeal diphtheria in private practice need only be referred to. 1704 cases of laryngeal diphtheria were included in this report as treated with antitoxin, of which 668 were operated upon. Of these 182 died, giving a mortality of 27.2 per cent. Before the use of antitoxin it was estimated that 90 per cent. of the cases of laryngeal diphtheria required operation, whereas now only 39 per cent. require it. Previously 27 per cent. approximately represented the recoveries, while now 27 per cent. represents the mortality, exactly reversing the figures; in other words, before the use of antitoxin 27 per cent. recovered, while now 73 per cent. recover.

I desire to say a few words further in regard to the use of diphtheria antitoxic serum for immunization against diphtheria, for while the remedy is now universally employed throughout the world in the treatment of this disease it is much less generally employed as an immunizing agent. It was early employed in New York City, and has been more generally used here for this purpose than anywhere else in the world. The results here, however, have had ample confirmation in Europe. In the children's department of the Charité Hospital, Berlin, where formerly patients frequently contracted the disease, owing to the want of efficient isolation, the systematic use of immunizing injections was introduced three years ago. Since January, 1896, patients have even received injections every three weeks, as it was found that the resulting immunity could not be depended upon for a much longer period than this. The result has been that no child thus immunized has contracted the disease; this fact seems more remarkable because it was found that the diphtheria bacilli were present in the throats of nearly one-quarter of the children who were examined during a period of 5 months.

In order to ascertain whether the resulting immunity was due to the injections, or to some other influence, the injections were stopped in October, 1897. Shortly afterward, namely, early in November, a child three and a half years of age, suffering from Bright's disease, developed laryngeal diphtheria and died. A little later two other children in the same ward were attacked with typical

pharyngeal diphtheria, and a fourth child, who had been admitted for measles early in October, developed croup. These last three patients recovered after the injection of diphtheria antitoxin. After this experience the immunizing injections were resumed, and no further cases of diphtheria have occurred. The experiences previously reported in institutions in this city give exactly parallel results.

I shall only refer the reader to the accompanying tables for the results in the laryngeal cases treated by the inspectors of this city, although in many respects these afford the best test of the efficacy of the antitoxin treatment.

From the statistics presented it is apparent that the mortality from diphtheria and croup, which was so markedly reduced on the introduction and in consequence of the use of antitoxin, has continued to

TABLE I.

Cases of diphtheria treated with antitoxin by the Department of Health, January 1, 1898, to January 1, 1899, with a summary of cases treated, January 1, 1895, to January 1, 1899.

Total cases of true diphtheria injected with antitoxin by the Medical Inspectors of the Department of Health, showing the number of cases injected and the mortality percentage.

	Cases.	Deaths.	Mortality Per Cent.
Jan. 1, 1898, to Jan. 1, 1899..	626	68	10.8
Moribund deducted.....	21	....	....
Remaining.....	605	47	7.7
Jan. 1, 1895, to Oct. 1, 1896..	1,252	198	15.8
Moribund deducted.....	80	....	....
Remaining.....	1,172	118	10.0
Oct. 1, 1896, to Jan. 1, 1898..	1,195	163	13.6
Moribund deducted.....	71	....	....
Remaining.....	1,124	92	8.1
Total cases, Jan. 1, 1895, to Jan. 1, 1899.....	3,073	429	13.9
Moribund deducted.....	172	....	....
Remaining.....	2,901	257	8.8

decrease in proportion as the remedy has been more generally employed. It would be useless at this time to multiply statistics on this subject, which on the largest scale, and from the most diverse sources have given affirmative evidence of the value of antitoxic serum in the treatment of diphtheria. It is not easy to understand the mental attitude of those who still continue to oppose the antitoxin treatment of diphtheria in the face of the enormous mass of evidence in its favor. Whatever may be said of statistics in general, no practitioner who examines impartially the reports published by the New York City Department of Health, and reads the wholly unprejudiced and impersonal collective investigations instituted by the American Pediatric Society, by the Berlin Society for Internal Medicine, and the Kaiserliches Gesundheitsamt, and

the exhaustive and elaborate statistical studies issued by the medical superintendents of the hospitals of the London Asylums Board can fail to be convinced of the specific value of this remedy.

TABLE II.

Cases of laryngeal diphtheria treated with antitoxin by the Department of Health, January 1, 1898, to January 1, 1899, with summary of cases treated January 1, 1895, to January 1, 1899. Total cases of laryngeal diphtheria injected with antitoxin by the Medical Inspectors of the Department of Health, showing the number of cases injected, and the cases, deaths, and mortality percentage in both operative and non-operative cases.

	Laryngeal Cases.			Non-operative Cases.			Operative Cases (Intubation.)		
	Cases.	Deaths.	Mort. Per cent.	Cases.	Deaths.	Mort. Per cent.	Cases.	Deaths.	Mort. Per cent.
Jan. 1, 1898, to Jan. 1, 1899.....	185	32	17.3	125	14	11.2	60	18	30.0
Moribund deducted.....	11	....	....	7	....	....	4	....	....
Remaining.....	174	21	12.0	118	7	7.0	56	14	25.0
Jan. 1, 1895, to Oct. 1, 1896.....	355	108	30.4	283	79	27.9	72	29	40.2
Moribund deducted.....	38	....	....	34	....	....	4	....	....
Remaining.....	317	70	22.4	249	45	17.9	68	25	36.7
Oct. 1, 1896, to Jan. 1, 1898.....	286	78	27.2	214	51	23.8	72	27	37.4
Moribund deducted.....	45	....	....	31	....	....	14	....	....
Remaining.....	241	33	13.7	173	20	11.6	58	13	22.4
Total Cases, Jan. 1, 1895, to Jan. 1, 1899.....	826	218	26.4	622	144	23.1	204	74	36.2
Moribund deducted.....	94	....	....	72	....	....	22	....	....
Remaining.....	732	124	16.9	550	72	13.1	182	52	28.1

TABLE III.

Cases of diphtheria treated with antitoxin by the Department of Health, arranged according to age, January 1, 1898, to January 1, 1899, with summary of cases treated, January 1, 1895, to January 1, 1899.

	0-1 year.	1-2 years.	2-3 years.	3-4 years.	4-5 years.	5-10 years.	Over 10 years.	Total.	Moribund deducted.	Remaining.
Jan. 1, 1898, to Jan. 1, 1899...										
Cases.....	23	90	120	102	81	175	35	626	21	605
Deaths.....	1	14	20	9	8	15	1	68	....	47
Mortality per cent.	4.3	15.5	16.6	8.8	9.8	8.6	2.8	10.8	....	7.7
Jan. 1, 1895, to Oct. 1, 1896...										
Cases.....	74	214	252	189	182	260	81	1,252	80	1,172
Deaths.....	21	51	43	30	26	26	1	168	....	118
Mortality per cent.	28.3	23.8	17.0	15.9	14.2	10.0	1.2	15.8	....	10.0
Oct. 1, 1896, to Jan. 1, 1898...										
Cases.....	61	184	202	191	135	331	91	1,195	71	1,124
Deaths.....	13	34	42	23	16	33	2	163	....	92
Mortality per cent.	21.3	18.4	20.5	12.0	11.8	9.9	2.2	13.6	....	8.1
Total Cases, Jan. 1, 1895, to Jan. 1, 1899...										
Cases.....	158	488	574	482	398	766	207	3,073	172	2,901
Deaths.....	35	99	105	62	50	74	4	429	....	257
Mortality per cent.	22.1	20.3	18.3	12.9	10.0	9.6	1.9	13.9	....	8.8

TABLE IV.—Cases of diphtheria treated with antitoxin by the Department of Health, arranged according to day of disease on which treatment was begun, January 1, 1898, to January 1, 1899, with summary of cases, January 1, 1895, to January 1, 1899.

	1st Day.		2d Day.		3d Day.		4th Day.		5th Day or Later.		Day Unknown.		Total.		Mortality Per cent.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
Jan. 1, 1898, to Jan. 1, 1899..	69	0	183	8	148	21	88	13	117	26	1	0	626	68	10.8
Mortality per cent.....	0.0	0.0	4.3	4.3	14.2	14.2	14.7	14.7	19.0	19.0	0.0	0.0	10.8	10.8	10.8
Moribund deducted.....	0	0	2	0	4	0	4	0	11	0	0	0	21	0	0
Remaining.....	69	0	181	6	144	17	84	9	106	15	1	0	605	47	7.7
Mortality per cent.....	0.0	0.0	3.3	3.3	11.8	11.8	10.7	10.7	12.0	12.0	0.0	0.0	7.7	7.7	7.7
Jan. 1, 1895, to Oct. 1, 1896..	157	11	331	30	293	42	197	39	262	72	12	4	1,252	198	15.8
Mortality per cent.....	7.0	7.0	9.0	9.0	14.3	14.3	20.0	20.0	27.4	27.4	33.3	33.3	15.8	15.8	15.8
Moribund deducted.....	5	0	14	0	17	0	15	0	25	0	4	0	80	0	0
Remaining.....	152	14	317	30	276	42	182	39	237	72	8	4	1,172	198	10.0
Mortality per cent.....	4.0	4.0	5.4	5.4	9.0	9.0	13.2	13.2	30.0	30.0	0.0	0.0	10.0	10.0	10.0
Oct. 1, 1896, to Jan. 1, 1898..	120	2	253	6	257	23	198	29	359	101	8	2	1,195	163	13.6
Mortality per cent.....	1.6	1.6	2.3	2.3	8.9	8.9	14.6	14.6	27.8	27.8	25.0	25.0	13.6	13.6	13.6
Moribund deducted.....	1	0	1	0	5	0	16	0	46	0	2	0	71	0	0
Remaining.....	119	2	252	6	252	23	182	29	313	101	6	2	1,124	163	8.1
Mortality per cent.....	0.8	0.8	1.9	1.9	7.1	7.1	7.1	7.1	17.5	17.5	0.0	0.0	8.1	8.1	8.1
TOTAL CASES.															
Jan. 1, 1895, to Jan. 1, 1898..	346	13	767	44	698	86	483	81	738	199	21	6	3,073	429	13.9
Mortality per cent.....	3.7	3.7	5.6	5.6	12.4	12.4	16.9	16.9	26.2	26.2	28.6	28.6	13.9	13.9	13.9
Moribund deducted.....	6	0	17	0	26	0	35	0	82	0	6	0	172	0	0
Remaining.....	340	13	750	44	672	86	448	81	656	199	15	6	2,901	429	8.8
Mortality per cent.....	2.5	2.5	3.6	3.6	8.9	8.9	10.2	10.2	17.3	17.3	0.0	0.0	8.8	8.8	8.8

TABLE V.

Immunization with antitoxin by the Department of Health Inspectors, January 1, 1898, to January 1, 1899, with summary of cases immunized, January 1, 1895, to January 1, 1899.

Table of cases immunized with injections of antitoxin in families where diphtheria had occurred, showing the number of cases immunized, the number of cases which occurred after thirty days and within twenty-four hours after injection, and those which occurred within thirty days after injection.

No. of Cases Immunized.	No. of Cases of Diphtheria within 30 days after Injection.	No. of Cases of Diphtheria within 24 hours and after 30 days after Injection.
Jan. 1, 1898, to Jan. 1, 1899. 1,408 Cases.	1 on the 7th day, moderately severe, recovered. 1 on the 3d day, mild, recovered. 1, no day stated, mild, recovered.	
Jan. 1, 1895, to Oct. 1, 1896. 1,207 Cases.	1 on the 7th day, 1 on the 10th day, 5 on the 19th day, 1 on the 23d day, 1 on the 30th day, 1 on the 5th day, severe, recovered. 1 scarlet fever and diphtheria, died on the 2nd day.	Mild, recovered.
Oct. 1, 1896, to Jan. 1, 1898. 2,493 Cases.	2, no day stated, 2 on the 7th day, 2 on the 8th day, 1 on the 9th day, 1 on the 12th day, 1 on the 30th day, moderately severe, recovered.	Mild, recovered.

TABLE V.—Continued.

Jan. 1, 1895, to Jan. 1, 1899. 5,108 Cases.	19 mild, recovered. 3 severe, recovered. 1 scarlet fever and diphtheria, died on the 2d day.	Within 24 hours. 15 mild, recovered. 10 severe, recovered. 1 croup, died. After 30 days. 3 mild, recovered. 4 severe, recovered. 2 septic, died on 35th and 38th day, respectively.
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NOTE TO TABLE V.: There were, in all, 1538 families in which one or more cases of diphtheria had occurred previous to immunization. Out of a total of 5108 cases immunized during the four years, 1895 to 1899, only 3 deaths from diphtheria occurred, 1 developing on the second day after immunization of scarlatina and diphtheria, and 2 septic cases on the fifty-fifth and thirty-eighth days, respectively, after immunization; 25 cases of diphtheria which occurred within twenty-four hours, 22 cases within thirty days, and 7 cases after thirty days after injection, in all 54 cases, recovered.

On October 1, 1895, arrangements were made to enable physicians to obtain supplies of antitoxin free for use among patients too poor to pay for the remedy, on condition that reports of the cases thus treated should be furnished to the Department of Health. Druggists acting as agents for the sale of antitoxin were instructed to furnish the remedy free to any physician upon his statement that the patient for whom it was intended was not in circumstances to pay for it. A blank was furnished upon which the history of the case could be filled out by the attending physician upon the termination of the case, either by death or recovery. This arrange-

ment, not very generally known or utilized by physicians at first, has come more and more into use until now a large number of cases of diphtheria are treated by physicians with antitoxin furnished free to poor patients.

TABLE VI.

Cases of diphtheria treated by physicians with free antitoxin, collated from the reports of the attending physicians, January 1, 1898, to January 1, 1899, with summary of cases treated, October 1, 1895, to January 1, 1899.

	Cases.	Deaths.	Mortality Per cent.
Jan. 1, 1898, to Jan. 1, 1899.....	868	138	15.9
Moribund cases deducted.....	60	....	....
Remaining.....	808	78	9.6
TOTAL CASES.			
Oct. 1, 1895, to Jan. 1, 1899.....	2,112	373	17.6
Moribund cases deducted.....	143	....	....
Remaining.....	1,969	230	11.7

NOTE TO TABLE VI.: From January 1, 1898, to January 1, 1899, there were treated with free antitoxin 868 cases, with 138 deaths, giving a mortality of 15.9 per cent.; of these 60 were moribund at the time of or died within twenty-four hours after the first injection; deducting these the mortality was 9.6 per cent. Of the total cases treated with free antitoxin from October 1, 1895, to January 1, 1899, viz., 2,112, 373 died, giving a mortality for the three years of 17.6 per cent. Deducting 143 moribund cases the mortality was 11.7 per cent.

Altogether 2511 cases of suspected diphtheria were injected with free antitoxin, October 1, 1895, to January 1, 1899, but 399 of these are excluded from the statistics, either because on culture examination no diphtheria bacilli were found, or because they were transferred to the Willard Parker Hospital; and thus passed from observation, or because the data furnished were insufficient for tabulation.

Of the 2112 cases included in the statistics, 1458 were bacteriologically confirmed to be true diphtheria; of these 180 cases died, or 12.3 per cent. Of the 654 cases not confirmed by bacteriological examination, but proving to be clinically undoubted diphtheria, 173 died, or 26.5 per cent. Many of these were moribund at the time of the first injection.

TABLE VII.

Cases of laryngeal diphtheria treated by physicians with free antitoxin, January 1, 1898, to January 1, 1899, with summary of cases, October 1, 1895, to January 1, 1899.

	Total Laryngeal Cases.			Non-operative Cases.			Operative Cases.		
	Cases.	Deaths.	Mortality Per cent.	Cases.	Deaths.	Mortality Per cent.	Cases.	Deaths.	Mortality Per cent.
Jan. 1, 1898, to Jan. 1, 1899.....	292	84	28.7	209	48	22.9	83	36	43.3
Moribund deducted.....	40	....	....	29	....	....	12	....	....
Remaining.....	252	44	17.4	181	20	11.0	71	24	33.8
TOTAL CASES.									
Oct. 1, 1895, to Jan. 1, 1899.....	748	227	30.3	529	139	26.2	219	88	40.2
Moribund deducted.....	98	....	....	67	....	....	31	....	....
Remaining.....	650	129	19.8	462	72	15.6	188	57	30.3

TABLE VIII.

Absolute annual deaths and death-rates for 100,000 population from diphtheria and croup in Paris, Berlin, and New York (Manhattan and Bronx) from 1886 to 1898 inclusive.

	PARIS.		BERLIN.		NEW YORK.	
	Absolute Deaths.	Death rate per 100,000 population.	Absolute Deaths.	Death rate per 100,000 population.	Absolute Deaths.	Death rate per 100,000 population.
1886	1,524	73.2	1,662	125.7	2,695	187.5
1887	1,564	76.9	1,392	100.7	3,056	205.6
1888	1,718	83.7	1,195	76.1	2,353	167.7
1889	1,706	79.9	1,210	85.6	2,291	146.2
1890	1,639	77.5	1,601	102.0	1,783	110.6
1891	1,363	63.0	1,342	67.5	1,970	118.7
1892	1,398	63.6	1,637	92.5	2,106	123.3
1893	1,262	51.4	1,416	100.8	2,358	145.5
1894	993	40.7	1,321	86.7	2,870	158.4
1895	435	17.8	987	59.2	1,976	105.2
1896	444	17.6	559	30.4	1,763	91.2
1897	351	13.8	545	31.5	1,590	79.9
1898	301	12.0	652	32.4	923	45.1

NOTE: The figures for 1897 and the first half of 1898 in Paris and Berlin are taken from the monthly reports, while the latter half of 1898 is estimated from the weekly reports. The rest of the data are taken from the annual reports.

It will be seen from an examination of this table that the average number of deaths from diphtheria and croup in Paris and Berlin for the preantitoxin period (1886 to 1895) was 1463 and 1419 respectively, whereas for the antitoxin period (1895 to 1899) it was 383 and 686, or less than one-half. In New York City antitoxin has not been so generally used as in the other two cities until the last year. But the average number of deaths from diphtheria and croup in New York from 1886 to 1895 was 2654, while from 1895 to 1899 it fell to 1563, and in 1898 it was only 923. The fall in the death-rate from this disease since the introduction of antitoxin is equally conspicuous, estimated per 100,000 of the population.

Diphtheria has always been much more prevalent in the great cities of this country, and especially New York, than in the capitals of Europe, and the death-rate per 100,000 of the population has always been and still remains much higher. The diminution in the death-rate, however, in 1898, as compared with 1894, is greater in New York than in either Paris or Berlin, or any great city of Europe. The case fatality, too, is as low or lower than that of any other great city. The great prevalence of the disease in New York is no doubt due to the great density of the population and the character of the housing of the tenement-house population, which is more favorable to the extension of infectious diseases than that of any great city of the world.

TABLE IX.

Diphtheria and croup in New York City from 1891 to 1898 inclusive, showing cases, deaths, and case fatality.

	CASES.			DEATHS.			CASE FATALITY.	
	Diphtheria.	Croup.	Total.	Diphtheria.	Croup.	Total.	Diphtheria.	Diphtheria and Croup.
1891	4,874	490	5,364	1,361	609	1,970	27.9	36.7
1892	4,654	530	5,184	1,436	670	2,106	30.9	40.6
1893	6,468	553	7,021	1,970	588	2,558	30.4	36.4
1894	9,155	486	9,641	2,359	511	2,870	25.8	29.7
1895	9,925	428	10,353	1,634	342	1,976	16.4	19.1
1896	11,095	306	11,401	1,555	208	1,763	14.0	15.4
1897	10,466	400	10,866	1,376	214	1,590	13.1	14.6
1898	7,213	380	7,593	788	135	923	10.9	12.2

NOTE: Previous to 1891 croup, not being classed as a contagious disease, was not reported to the Health Department. In January, 1895, the distribution and use of antitoxin produced by the New York Department of Health was begun, but antitoxin did not come into general use in the city until 1896.

TABLE X.

Cases, deaths, and mortality percentage of all cases of diphtheria in the hospitals of Paris, Berlin, and London from 1893 to 1898.

	PARIS HOSPITALS.			BERLIN HOSPITALS.			LONDON HOSPITALS.		
	Cases.	Deaths.	Mortality Per cent.	Cases.	Deaths.	Mortality Per cent.	Cases.	Deaths.	Mortality Per cent.
1893	1,882	968	51.4	2,450	951	38.8	2,848	865	30.3
1894	2,355	837	35.5	2,890	801	27.7	3,666	1,035	28.2
1895	2,664	363	13.6	3,061	484	15.8	3,685	820	22.2
1896	2,363	360	15.2	2,138	285	13.3	4,508	948	21.0
1897	1,683	253	15.0	1,937	263	13.5	5,673	987	17.4

NOTE: The statistics for 1898 have not been published in full, and are, therefore, omitted. Antitoxin was introduced into the hospitals of Paris and Berlin toward the end of 1894, but was not generally employed until 1895. In the hospitals of the Metropolitan Asylum Board of London antitoxin was not introduced until 1895.

(To be continued.)

LIGHT AND AIR IN THE TREATMENT OF CONSUMPTION IN COLORADO.¹

BY CHARLES FOX GARDINER, M.D.,
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In the etiology of pulmonary tuberculosis one fact stands out more clearly and is proved more positively than any other, and that is the enormous influence such simple factors as light and fresh air have upon the development of this disease. In fact from the dawn of human history this influence has been noted,² and all human experience as well as scientific research have demonstrated that consumption is a disease of the indoor domestic animal, man included, and that when air and light are curtailed, then consumption begins to strike down those who from deficient lung power are least fitted to survive. Another fact now proved beyond question is that reversing the greatest predisposing cause (a lack of air and light), and supplying the air and light to excess, we have the most powerful weapon now known with which to fight and conquer this widespread and destructive disease. Even nutrition, important and powerful as it certainly is in treating the tubercular, must hold second place to light and air. I have seen hundreds of range cattle exposed to air and light dying of starvation and cold and never a case of tuberculosis among them; while, on the other hand, cattle from the same herd, sheltered, well fed

and cared for, do occasionally develop the disease. It seems to me that, in the face of such strong evidence as we can now show as to the value of air and light in curing consumption (a remedy far more effectual than all other agents taken together), the average physician passes over them with scant notice, and the brief order to the patient, "Be out all you can," results in but a small daily dose of fresh air—a quantity entirely too limited for the result desired. That this is a mistake, and that the most efficient remedy we have for consumption should be used with care, system, and in heroic doses, is very clearly shown by the results obtained in the sanatoriums both in this country and abroad.³

When used as a cure the qualities of the air should be considered; these depend upon climatic conditions, and to state, as some men have, that, conditions being equal in other respects, climate is of little importance is not true or logical. As the dose and purity of a drug determine its favorable action upon the diseased condition it is intended to cure, so the dose and purity of the air and light, used as a cure, determine their efficient action in consumption. Any student of climatology knows that air and light differ materially in available dose and purity, even in narrow geographical limits, while a more extended view shows us climatic changes much more intense and radical. Air ought to be (1) pure—free from dust and germs;⁴ (2) dry and thin—to favor chest expansion, to give greater supply of blood to the lungs and increased richness to the blood, and also to permit greater penetration of solar rays, thus limiting tubercular infection from others;⁵ (3) cool—to act as a stimulant; (4) and with an excess of ozone and electricity.⁶

¹ Otis, "Hospitals and Sanatoria for Consumption Abroad," *Boston Med. and Surg. Jour.*, p. 22, 1898.

² *Tuberculosis and Altitude.*—In a recent work published in Mexico (*La Vie sur les Hauts Plateaux*), which won the Hodgkins' prize of the Smithsonian Institute, Herreta and Lope devote a chapter to the treatment of tuberculosis by altitude, noteworthy in many respects. They find that statistics show that not only in men but in lower animals tuberculosis is decreased in high regions. In 1885, out of 73,000 cattle killed in the general abattoir of the City of Mexico, only forty-five were tuberculous. This favorable effect they attribute to the higher solar illumination in high altitudes and the dryness and coolness of the atmosphere as working against the existence of microbes. The benefits of rarefied air in consumption are given by the authors from their experimental and other observations, as follows: (1) Lessening pressure increases the circulation of air in the lungs, dilates them and obviates torpid parts to functionate. (2) Lessening pressure determines a greater quantity of blood in the lungs. (3) Lessening pressure permits a uniform distribution of blood, regulates its circulation and combats congestion. (4) Lessening pressure diminishes intrapulmonary tension in general and particularly intravascular tension. (5) Augmentation of red and white globules. (6) Desiccation of mucous surfaces; the favoring of evaporation, besides experiments on animals, observations of actual cases of tuberculosis, treated by rarefied air, are reported by the authors. Of 13 patients thus treated only 1 lost weight, 1 remained stationary, and 11 notably increased, 1 increasing 300 grams in one day. In none, either healthy or tuberculous, were the alarming symptoms described by Paul Bert experienced.

³ Gardiner, *Amer. Jour. of the Med. Sciences*, 1892 and 1897.

⁴ Braithwaite's "Retrospect of Medicine," p. 239, 1899.

¹ Read at the sixteenth annual meeting of the American Climatological Association, held at New York, May 9, 10, and 11, 1899.

² Aryteus Celsus, "Treatment of Consumption."

Light should be sunshine, or directly diffused from it, and with as little cloudy or white light as possible. With these qualities of light and air, we have at our command the most powerful agents known for the cure or arrest of pulmonary phthisis, and these perfect atmospheric conditions are found only upon the dry, high plateaux of the world. Some of the qualities spoken of are found at the seashore, some in low elevations, as in a desert atmosphere; but for all the qualities mentioned in both light and air, altitude and dryness must be present. The effects of sunlight upon germ life are well-known to all, and recent observations have shown that a partial absence of light tends to, and even does, develop consumption, when the air supply and other conditions remain the same.¹ Then, too, the direct solar rays are now known to penetrate live tissue and exert their influence as germicides. Experiments by Koch, Downs, Blunt, Duclaux, Esmarch, and Arloing are cited by Abrams—all tending to show the power and penetration of solar rays, their effect as a stimulant of cellular life of plants and animals in health and disease, and their power as a cure. There is also good reason to believe that the solar rays pass through ordinary clothing and have a stimulating effect upon capillary circulation, and nerve endings.

A climate which has all the qualities of light and air that I have mentioned, ought to present ideal climatic conditions for the cure of consumption. In Colorado these climatic conditions do exist. Not only is there an average of fifty per cent. more sunshine every day in Colorado than in any State east of the Mississippi River, but the soil, temperature, and dryness of the air permit the pulmonary invalid to take advantage of these conditions. A simple experiment illustrates atmospheric light penetration in Colorado: expose several films in a camera (time exposure), and then under the same conditions in regard to films, time, sunlight, etc., expose the other half of the films at sea-level, or at the seashore, and the latter set of films will be found to be fogged from under exposure, the more dense air not allowing light to penetrate as easily as in Colorado. It is probably this property in the air of Colorado (dermthitsity or thinness) that removes color so rapidly from all dyed fabrics, tans the exposed skin so easily, and allows the sun and diffused light to act so powerfully as a germicide. The practical point is to utilize this light and air in the best possible way for our patients in Colorado, or in all sections of the country having these climatic advantages.

To ascertain the time spent out of doors by the average invalid in Colorado Springs I have departed

somewhat from the method of making meteorological tables, which show merely the number of days suitable for him to be out, and have compiled a list giving the time an average invalid actually spends in the open air. Meteorological tables, no matter how carefully compiled, give but a limited idea as to certain climatic details. Temperature is frequently misleading, as in Colorado the dry air allows an outdoor life at temperatures that would in a more humid climate be impossible or dangerous, while such climatic factors as dust are not noted in ordinary tables; and so on. This chart has been compiled from an average of observations taken during the time from December 16, 1898, to April 19, 1899. This was to make as severe a test as possible, as it is during these months we have in Colorado our most inclement weather. As last winter and spring were of unusual severity, in fact from all I can learn, the worst weather for any length of time of which we have a record, one can see that in this chart no flattering picture is drawn regarding our winter weather. By average invalid I mean those who are too ill to exercise by horseback-riding, cycling or golfing, or even walking, except very slowly, and yet are able to be up and about, and to spend considerable time out of doors, provided they are protected and can sit or lie down. The time spent out doors can be regulated to a fine point in a sanatorium, but I refer to invalids who are in their own homes, in hotels or boarding-houses. I tell these patients, as most doctors do, that they must be out all they possibly can. I specify the hours and arrange the details of shelter, etc., selecting the winter months, as that is the season when an open air life become so necessary to the pulmonary invalid, for he feels the cold and will instinctively choose the warm and often close air of a room, inhaling furnace gas, dust, and germs. In summer it is, on the contrary, an easy problem to induce patients to live an outdoor life; then all nature beckons to one, and even indoors the air is fairly pure by comparison, owing to the open doors and windows and the absence of artificial heat. I find that the average invalid spends outdoors daily about five hours, either on a piazza, driving, or at times walking a little. If the air and light are as important curative agents as I have stated, then five hours daily outdoors are not enough; we should aim at twenty-four hours. If we desire the best results we cannot afford to waste a single hour in fighting such a disease as tuberculosis. Few people realize the vast difference that exists between a so-called well-ventilated room and the open air; the former is enough to kill an Indian.¹

¹ Robinson, "Climatology of Nudity," *Trans. Amer. Climatological Assn.*, p. 233, 1898.

¹ "Environment in Its Relation to the Progress of Bacterial Invasion in Tuberculosis," *Amer. Jour. of the Med. Sciences*, July,

The experience of one who has just returned to his ordinary habits from a life of several weeks spent entirely in the open air illustrates this. No matter how well ventilated the room in which he sleeps, it will seem close and a cold in the head is apt to result. A simple experiment seems to me to bear closely on this subject. Take a piece of fresh venison or any meat and hang half of it in a room protected by fly screens, hanging the other half on top of a pole in the open air in the sun; even if this is done in the months of July or August the meat outside will remain fresh for weeks, while the meat in the room will spoil in a day or two. This is, of course, in Colorado, but I think the analogy between this meat-test and a septic process in the lungs a very close one. The piazza life in Colorado can be made most attractive and comfortable, and a piazza can be arranged, as one in my house is, with a stove and blinds, furnished with rugs, bed, etc., and enclosed with glass on the north. In this way we offer an inducement to be out of doors, it is not taken as a task, and the nights also can be spent in pure air.

A life on a ranch in Colorado would seem to offer to the invalid an ideal method of being in the air and light, and I have at present some patients who are certainly improving rapidly on ranches. But they do not represent the average invalid, as they are selected cases, especially adapted for the life, with youth, strong digestion, and entire absence of fever, making the experiment worth the risk. I practised medicine at one time for several years among ranches in Colorado, Wyoming, and parts of Utah, and my experience has been that it is all a well man can do to digest the food that is eaten on most ranches, since it is with hardly an exception poor food, poorly cooked. Ranch houses, too, are built without regard to sanitation, while the temptations to overexertion, exposure, etc., are constant. Their isolation is to many a great drawback, meaning, as it does, the difficulty of obtaining medical advice if taken suddenly ill; and no amount of fresh air can compensate for such disadvantages. The life in a boarding house or in their own homes, with the constant use of the piazza, is probably the most practical arrangement for the greatest number of invalids and is the plan used by at least ninety per cent. of all invalids in Colorado Springs.

1891. Also *Trans. Col. State Med. Soc.*, p. 321, 1894. Dr. Bull: "I have attended the Indians both here among the Sioux and in Idaho among the Bannocks. I have known many agency physicians and have talked with them. All agree that the older Indians say that they did not have consumption among them when they lived in teepees and in the open air. But as civilization advanced among them the Government has constructed log cabins and small frame houses for them, and they have given up the teepee for a short time in the hottest weather in summer. Now we have consumption the most prevalent disease. More than half of the deaths are from it."

I consider that for a certain number of patients a life in a tent is really the nearest approach to the ideal life for a consumptive; I mean of course, with careful selection of the patient for such a life, and then a careful selection of tent, camping-site, etc., so essential to success. To most people a tent simply means what is ordinarily used in camping out, and it is this limited knowledge of tents that has brought them into disrepute with many physicians. The tent generally used is too low, made of thin duck, often without a floor, without proper artificial heat and is pitched in the open, becoming like an oven in the Colorado sunshine. Above all, such a tent has no proper system of ventilation and this is important, since a tent never ventilates itself by air coming through the canvas, as some people seem to think. The tent I have in mind is the result of considerable evolution in tent building, and although I have not yet been able to demonstrate its use with a large number of patients, I have myself lived in it both in summer and in winter, during rain and snow storms and for several weeks at a time. It is made of very heavy duck (12 oz.), is circular in shape, 18 feet high, 16 feet in diameter at the floor, with a wall 5 feet, 6 inches high. The top terminates in an iron ring 1 foot in diameter, to which the canvas is fastened, thus forming an outlet for heated air always open. The tent is supported by a center pole to which the ring is attached, and the tent can thus be elevated or lowered or its tension changed from within by pulleys. The floor is raised 8 inches from the ground, and is in 8 sections, thus being easily moved. The lower edge of wall is fastened several inches below the floor, 1 inch from it all around; this is to provide at all times an inflow of air that is gradual and without a draught, since this inch space in a circular tent represents an area of about 600 square inches, and the hole in the top for outflowing air some 123 square inches. In this way the tent cannot be close and is ventilated automatically and constantly. In other words, it is a circular tent, the bottom of the canvas forming a circle around the wooden floor but one inch from it all around and a little below the floor. This open space between floor and sides of the bottom of the tent allows air to flow into the tent at all times, while the hole at the apex or top of the tent allows air to flow out all the time. In this way the tent always ventilates itself day or night, with door shut or not, or when heated or not, or in any weather.

As the air has to turn a corner to enter the tent, it cannot come as a draught and as it enters through all the inch space surrounding the tent it enters slowly and without force, being evenly distributed but coming through collectively a large area, 600

square inches. The tent is easily heated by a wood or coal-stove, and yet in warm weather the constant interchange of air keeps it cool even without a fly. This tent should be fitted up in every way like a room. Cooking need not be done in it, but can easily be provided for at some house near by. Such a tent can be lived in for at least eight months in the year in Colorado at 6000 feet altitude, and in winter can be transported, if necessary, to some warmer climate south. The advantages of tent life are plenty of fresh air and diffused light, all of the twenty-four hours taken without effort. The psychological effects of such a life cannot be told here, but that it is a constant mental rest, that the novelty charms, and that a certain something, possibly the awakening of the hunting and migratory instinct inherited from countless generations of primitive ancestors does affect beneficially the nervous system of the phthisical is undoubted.

The points I have endeavored to emphasize are that light and air are to-day the most powerful agents we have for the cure of pulmonary consumption; that this fact is often overlooked, and that attention is paid to cures of much less value; that the most perfect qualities of light and air are only found on high, dry plateaux of over 4000 altitude, and that, under such climatic conditions, not only is the quality of light and air more perfect than elsewhere, but the available quantity taken is in excess, as it is practical for the patient to be out and obtain it; that if possible a pulmonary invalid should be out doors every hour of the twenty-four, as indoor air is not a cure for phthisis, and that a piazza life can be arranged for and made as comfortable as in a room. Ranching, as generally utilized, is a dangerous life for the average invalid, owing to bad food, exposure, over exertion, etc. A selected number of patients can be induced with benefit to live a tent life provided the tent is properly selected and managed on the plan I have suggested. Thus, while avoiding the ills of civilization from which our patient is escaping, we so control the new environment of nature as to avoid all its dangers, and obtain all its benefits.

CLINICAL MEMORANDUM.

ARREST OF DEVELOPMENT; SPINA BIFIDA, AND CLEFT PALATE.

BY W. A. MCFARLANE, M.D.,
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Spina Bifida.—In looking up the literature on this subject, I find that nearly every article deals with the surgical treatment of this affection without much reference to its etiology. The following cases have some points of interest:

Mrs. X., aged twenty-four years, married, primipara, on August 5, 1883, gave birth to a female child that presented a tumor in the lower dorsal region of the spine. The babe died in convulsions four days later. During the sixth week of gestation the mother had received a severe injury to the spine by having a chair pulled from under her as she was about to sit down. This injury afforded a very good explanation for the cause of the deformity of the child.

On October 18, 1886, she gave birth to a second daughter who was deformed in the same manner as the first. The child lived two weeks and died of exhaustion. The mother had complained of some pain in her back during her second pregnancy, due probably to the injury which she received while carrying her first child, for she had not met with an accident during her second pregnancy. I attended her in her second confinement, but not in the first. In the case of the second child the tumor was situated in the lower dorsal region, was about 2½ inches in length by two in width, and was elevated above the surrounding tissues about three-fourths of an inch, was transparent, and of a dark-reddish or purple color.

I applied a truss with a concave pad, simply for the purpose of protection. This comprised the treatment, the parents objecting to any operation. The father and mother were very much disappointed in the result of this pregnancy, and I was immediately called upon for an opinion as to the possibility or probability of their ever having a child that would be all right. My experience was insufficient, neither could I find anything in books nor journals that would warrant me in giving advice either way. In my dilemma I counseled with Dr. Skene of Brooklyn, my former teacher, stating all the facts in my possession, and his reply was "to try again, for she might do better next time." He also advised the use of the syrup of the iodid of iron when she became pregnant again, during the second, fourth, sixth, eighth, and ninth months. When she became pregnant again this treatment was adopted and carried out. On May 14, 1890, I had the satisfaction of delivering her of a female child, perfect in every way.

To add to the difficulties of deciding this important question there was a family history which was not good. A sister and her daughter had heart disease, and in the daughter's case was probably congenital. She afterward died of chronic Bright's disease at the age of sixteen years. A brother's child was born with an amputation of the left forearm near the elbow.

Dr. John Ashurst, in Pepper's "Practice," mentions the fact that Salzman observed spina bifida in two children born of the same mother, and Camper noticed it in twins. Dr. L. Emmett Holt of New York reports a case in the *New York Medical Journal*, Vol. 46, in which the first and second child had spina bifida, the mother afterward giving birth to a healthy well-formed child. No statement is made, however, in regard to her treatment. In the *Medical and Surgical Reporter*, Vol. 58, Dr. Samuel Wolf of Philadelphia reports a case in which the mother gave birth to two children having the malforma-

tion. He outlined a plan of treatment which consisted in a careful regulation of the diet, the administration of hypophosphites, lactophosphate of lime, cod-liver oil, etc. He was unable, however, to test his plan of treatment on account of the patient's moving out of his district, but he learned later that she gave birth to one child, at least, that was not deformed. These are the only cases I have been able to find reported in which a mother has given birth to two children having this deformity.

Cleft Palate.—Mrs. Y., on September 2, 1894, gave birth to a male child having cleft palate. It was weak and died four weeks later. August 2, 1896, she was confined again. This child was perfectly formed, and is living at the present time and is in good health. During her second pregnancy she received treatment which consisted in the administration of the syrup of the iodid of iron, the same as in the case preceding, and the results were entirely satisfactory. She was confined again on April 20, 1898, at seven months. This child had talipes varus of the left foot, and in place of the fourth and fifth toes there was a gelatinous mass extending back to the middle of the metatarsal bones. She had taken the iron irregularly. The family history of the mother was not good; an uncle had died of locomotor ataxia, her mother had goiter and died of apoplexy at fifty years of age. The mother of the child had a sister who had hysteria.

THERAPEUTIC NOTES.

Treatment of Bright's Disease.—NESTOR TIRARD ("Albuminuria and Bright's Disease") inculcates the following principles of treatment of this disease: In the acute form of nephritis rest in bed, restricted diet, the wet pack, diaphoretics and cathartics are to be employed during the first few days, until an increase of the amount of urine voided and the absence of hematuria denote that the renal engorgement has subsided. Until this occurs, nitrogenous food and active diuretics are contraindicated. A strict milk diet is administered when possible, but in case digestive disturbance is produced thereby, small amounts of broth of chicken, veal or mutton may be added or substituted. Persistent vomiting should be combated by small doses of hydrocyanic acid, preparations of bismuth, drop doses of tincture of iodine, or small doses of creosote or carbolic acid.

In coma or convulsions active cathartics, as croton oil, are to be administered, and if persistent headache is present, small doses of calomel combined with compound pill of colocynth are given. The wet pack is preferred to the hot-air or vapor bath, as being more convenient of application and of equal efficiency. Restlessness and insomnia are to be combated with the bromids, hyoscin and, sometimes aconite. If anasarca exists to such a degree that relief is not afforded by purgatives and the wet pack, the skin over the malleoli may be punctured to allow the serum to drain off. Digitalis and caffeine are indicated as diuretics after the hematuria has disappeared. During convalescence exposure to cold, and any muscular or mental strain must be avoided. Strict attention must be

paid to the diet as long as albuminuria persists, and the non-astringent preparations of iron and arsenic should be given as tonics.

In chronic nephritis, if any cause can be found—as malaria, syphilis or suppuration—this must be treated, using mercury with great care, should it be indicated. In cases exhibiting excessive dropsy and muscular weakness, rest in bed is indicated; but when the patient's strength is good and there is but slight anasarca, a moderate amount of outdoor exercise is beneficial. The question of withholding albuminoids from the diet must be decided by the effect produced on the individual patient, though no nitrogenous food should be allowed if hematuria exists. The only limit to the amount of albuminoids to be allowed is the ability of the patient to digest them. Although sometimes a strict milk diet will cause the albuminuria to disappear, it is not, as a rule, wise to confine the diet too strictly to milk. If the patient's habits have been such that a bad effect is produced by a complete deprivation of alcohol, a small amount may be allowed, but it must be always largely diluted and taken only at meal times. If these conditions are observed, the form in which it is taken is of slight importance; and if no loss of appetite or indigestion results from the withdrawal of alcohol, none should be given. Diminution in the amount of urine voided may often be corrected by copious draughts of water, or, if the patient can bear it, of milk. The cardiac tonics—strophanthus, digitalis and caffeine—are indicated, and the alkaline diuretics if there is no hematuria. Dropsy is to be treated by purgatives, such as the compound powder of jalap and the salines, given in doses to be regulated by the effect produced on the patient; by the carbonates and citrate of lithium and the citrates and tartrates of sodium and potassium; and, when the heart and lungs are in good condition, by small doses of pilocarpin given in connection with the wet pack. The same agents are to be employed in the treatment of uremic symptoms. Dyspnea should be treated according to its cause, engorgement of the lungs or weakness of the heart or uremic poisoning. The use of morphin is not recommended. Life in a warm, equable climate is to be desired and light and non-exciting occupation should be followed if possible.

Treatment of Ozena with Citric Acid.—HAMM (*Munch. Med. Woch.*, April 11, 1899) recommends the application of citric acid in ozena, as the best means of taking away the terrible odor, which not only disgusts all with whom the patient comes in contact, but also often destroys the appetite of the afflicted individual. Hence, the mere removal of the odor is often followed by a marked improvement in the patient's general condition. The citric acid, however, has also a slight beneficial effect upon the nasal lesions. It can be used either pure, or better mixed in equal parts with sugar of milk. The nose is thoroughly cleansed in the morning, and the powder is then blown into it, and the insufflation is repeated at noon and at night. The deodorizing effects continue some days after the discontinuance of the powder, and as the citric acid has no harmful action; it may be used as often as is necessary.

Liquid Thiolum to Relieve Pain.—NIKULIN (*Deut. Med. isinal-Zeitung*, April 17, 1899) has used pure liquid thiolum to relieve the pain of contusions, abscesses, acute and chronic gout and rheumatism, neuritis and myositis, finding it beneficial in promoting absorption as well as in stilling pain. In the acute cases the results followed more quickly than in the chronic ones. The thiolum was painted upon the affected portion of the body with a brush, several coats being applied, and was allowed to dry. It was then covered with a bandage to keep it clean, and two days later another application was made if necessary. At the end of the treatment the excess of the substance was washed away with warm water or alcohol. In no case was any irritation of the skin observed, even after repeated applications of thiolum.

Treatment of Acute Gastritis in Children.—The first step in the treatment of this disease is to see that the stomach is thoroughly emptied of all irritating matter (PEPPER, "Keating's Cyclopaedia," vol. v). If the child has not vomited very freely the stomach should be thoroughly washed out, either by lavage, or if that cannot be employed for any reason, by administering warm water and ipecac. After the stomach has been well emptied no food must be allowed until the organ has become entirely quiet. Vomiting may be controlled by administering cracked ice or albumen-water. Calomel in minute doses should be given if an offensive diarrhea is present. Bismuth is often of use, but sometimes the cautious use of morphin is necessary. But the stomach will usually become quiet after the withdrawal of all food sooner than as a result of medication. Fever should be treated by sponging the body or by the tepid bath. Antipyretics should be used only in very exceptional cases. The return to the ordinary diet must be very gradual.

Treatment of Pertussis.—CHENEY ("Keating's Cyclopaedia," vol. v). The patients, of course, should be isolated and allowed to have plenty of fresh air both by day and night and should be allowed plenty of good nourishment. The drugs to be employed are: First, antiseptic agents, the best of which are the vapors of carbolic acid, cresolin and thymol, and quinin, which can be included in this class. It is very valuable, if the child can retain it, given in doses according to the age of the patient— $\frac{3}{10}$ of a grain for each month and $1\frac{1}{4}$ grains for each year of the child's age—three times a day. Secondly, antispasmodics, of which the most useful is bromoform, which should not be given in solution but on sugar in a spoon, in doses of 1 drop every four hours, increasing the dose by one drop each day until an effect is produced. Antipyrin in combination with bromid of sodium is also of much value in the treatment, given in doses of $\frac{1}{4}$ a grain of the former to 2 grains of the latter, for a child of eight months; 1 to $2\frac{1}{4}$ grains for a child of fifteen months, and 2 to 3 grains for a child of from two years and a half to four years of age. Belladonna may be given in small doses, repeated until the physiological effect is produced.

Fatal Poisoning by Benzine.—SPURR (*Lancet*, June 3, 1899) records the death of an epileptic woman,

aged twenty-six, fifty hours after taking about an ounce of benzine. Only a few cases of poisoning with this very common substance have been reported. In most of them the symptoms have been of a narcotic character. In this instance the patient complained of a severe burning pain in the mouth and throat, and although she was given a strong emetic of mustard and water soon after the accident, there was collapse rapidly progressing to a fatal termination. Swallowing soon became well-nigh impossible. At the post-mortem examination the mucous and submucous coats of the esophagus, stomach, and duodenum, were found to be intensely inflamed, and in the duodenum there were erosions of the mucous membrane, but no perforation. The brain, lower portions of both lungs, the liver, spleen, and kidneys were all intensely congested. The absence of narcotic symptoms was thought to be due to the prompt administration of the emetic.

Xeroform, Externally and Internally.—BARKSKY (*Rev. de Therap. Medico-Chir.*, May 15, 1899), after using xeroform in 417 cases (in 34 of them internally), formulated the following conclusions in regard to its action: (1) Xeroform although not a powerful antiseptic is a most serviceable one. It is decomposed by the alkaline fluids of the body into bismuth and tribromophenol. The former makes an insoluble compound with ptomaines and renders them innocuous, and acts mechanically to prevent the entrance of microbes. The latter constituent has a germicidal action. (2) It is not changed by light, air, or heat. It can be sterilized repeatedly up to 120° C. without alteration. (3) It is not only without odor, but it dispels the bad odors which come from ulcers of the skin, or suppurating cavities connected with the genitals or alimentary canal. (4) It possesses drying properties to a high degree. It does not form a crust over a wound, nor stick to the surface, but is carried with the discharges into the dressing. (5) It has an analgesic and a hemostatic action, and favors the growth of healthy granulations, and so hastens the healing. (6) It is not at all toxic, and does not exert any irritation either upon the wound or the surrounding tissues. It was used in the form of a powder, as a salve, in gauze, and in bougies. Internally it was given in an emulsion, the dose being from 3 to 8 grains, three times a day. It was prescribed for acute and chronic gastric troubles, and for urticaria.

For an Early Morning Diarrhea.—LEMOINE (*Nord Med.*, p. 86, 1899) thinks that the morning diarrhea, occurring especially in nervous individuals with an excess of hydrochloric acid, can be favorably affected by a suitable diet. Roast or broiled meat should be taken at supper time, and no vegetables. He gives his patients 2 to 4 grams (3 ss to 3 j) of bicarbonate of soda before the evening meal, and at bedtime 10 grams (3 ijs) of gelatinized phosphate of chalk, either in milk or in syrup.

Diarrhea after meals occurs also in hyperchlorhydric persons. They should be put upon a correct diet, and should lie down after eating. Each meal should be followed by 2 or 3 drops of acetate of opium in a little water.

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SATURDAY, JULY 22, 1899.

STREET DIRT AND TETANUS, WITH SOME REMARKS ON TREATMENT.

DURING the latter part of last week and the beginning of the present one a number of tetanus patients have been under treatment at various New York City hospitals. A number of deaths from the disease have been reported in the city itself, and from its suburbs. We have had quite an epidemic of what the newspapers call lockjaw. It is not unusual at this time of the year and the history of practically all of the cases is the same. There is a wound from a firearm or piece of fireworks on the Fourth of July. The lesion heals usually with little difficulty, to reopen some eight days to two weeks later, though sometimes it does not, when the symptoms of tetanus show themselves and the case either runs a rapidly fatal course or convalescence is very protracted, and in most instances some "mark" of the disease remains forever after impressed upon the sensitive nerve-centers.

The development of tetanus after certain kinds of wounds inflicted in city streets is not uncommon. It occurs especially after contused wounds accom-

panied by slight laceration of the skin, or upon what may be called simply lacerated wounds. The bacillus of tetanus is absolutely and unalterably anaerobic, that is it grows only in the absence of oxygen. It is not like so many other anaerobic bacilli, facultatively aerobic, or capable of at least some growth in the presence of oxygen. It is only when the bacillus somehow becomes buried in the tissues away from all contact with the air that it finds a favorable nidus for growth in the human organism. Lacerated wounds or contusions with slight abrasions of the skin furnish just such an opportunity for growth away from the air. It seems that the dust of city streets, especially in the summer time, usually contains tetanus bacilli, so that the primary element necessary for the production of the disease is practically always at hand.

Notwithstanding that we possess an antitoxic serum that is effective in preventing the development of the disease in animals, its employment has done very little good in human beings. Cures have been reported from its use, but a certain number of tetanus patients always recover and there is more than a suspicion that it is mostly in the cases more or less chronic from the beginning, and in which recovery often takes place even under old methods of treatment, that the serum seems to be effective. Certain it is that a number of individuals afflicted with the acute variety of the disease die despite the very generous employment of the serum.

Even in the case of animals the fact of the matter is that the animal cannot be saved by ordinary subcutaneous injections of tetanus antitoxin if distinct symptoms of tetanus are already present. The injection to be effective must be given before the symptoms begin to show themselves. Recently it has been shown that intracerebral injections of tetanus antitoxin are effective in curing the disease in animals even when symptoms are at their height. A certain number of cases of tetanus in human beings have also been treated in this way, and with good results as far as the tetanic convulsions are concerned, though we do not always know the ultimate outcome of the case. Dr. Gibb reports a case in the *British Medical Journal* for July 1, 1899, in which, after the cure of his tetanus, the patient died of cerebral abscess eight weeks after the injections had been given.

This method of intracerebral injections undoubtedly has its objections. It is a serious operation, and its sequelæ are often apt to be serious even with the most careful precaution. Its employment seems to be justified in very acute cases, however, as the disease in such cases is practically always fatal. The ideal method of treating tetanus, however, is the one we quoted from Professor Landouzy of the University of Paris in reviewing his book on "Serum Therapy" ("Notable Books," MEDICAL NEWS, March 18, 1899). He suggests the use of prophylactic injections of tetanus serum in cases of suspicious wounds. Tetanus antitoxin has of late years been made of such high antitoxic potency that it requires but the injection of a few drops of the serum to absolutely preclude the possibility of the development of tetanus. This procedure is certainly worth trying in the case of all contused and lacerated wounds that have been exposed to contamination by street dirt, and especially when they have been inflicted by firearms. It could do no harm even if there were no tetanus germs present. The serum, though of such high antitoxic potency, is absolutely innocuous. It would certainly save a great many lives and save the individuals, too, from a most horrible death in the midst of the conscious agony of tetanic convulsions. No one has yet, we believe, reported the use of this method in America. It seems distinctly worthy of such a trial.

SERUM-THERAPY IN DIPHTHERIA.

THERE are still some ultra-conservatives who think, or pretend to think (the latter is not an unusual state of mind, and may easily be assumed in perfect good faith in cases in which a public statement has once been made on a subject) that diphtheria serum has accomplished nothing in reducing the mortality from the dread disease. To these the statistics of the New York Board of Health and of the European cities where the remedy has been properly tested, as presented by Dr. Biggs in this issue, cannot be expected to bring conviction. A few others, who are so obstinate in their misoneism that a new therapeutic principle is an obvious impossibility, may be added to this list. To all others the specific curative properties of diphtheria serum is now a matter of absolute science.

Yet the opposition to diphtheria antitoxin has

not been without its good results. The jealous watchfulness over mortality statistics by the unconvinced has had its beneficial effect in making those statistics accurately representative of facts, and has had its influence in producing constant improvement in the quality of the serum supplied. The notoriety at once given to complications seemingly induced by serum, or to sequelæ of its administration, has led to a thorough investigation of these unlooked-for effects, and has brought about their more and more effective amelioration. It is well for scientific medicine, especially for therapeutics, that the conservative element in the profession is so strong. It saves many a premature acceptance of what seems at first a useful remedy. What good grounds there were for a reluctant conservatism in the acceptance of diphtheria serum as a remedy, may be judged from the fact that its first much-vaunted successes were really not due to the antitoxin at all, but to expectant treatment, for the serums first employed were of such low antitoxic value (fifty antitoxin units, and even lower) that whoever should pretend now to base statistics on the use of corresponding amounts would be laughed to scorn.

It is evident, however, that the day for true conservatism in the matter has gone by. Hesitation now degenerates into old fogyism—misonism is, we believe, the newer and more elegant term for this halting entanglement in ideas that have been outlived. The seal of professional approval has been put on the new remedy not by any one school or clique in medicine, and the hearty approval has not been dictated by national or other extraneous motives. It has been the result of careful observation in hundreds of thousands of cases all over the world. Statistics can still, in certain places, be so manipulated and discussed, that there remains in some minds just a shade of doubt, but this is only true because prejudice exists. The sentiment of the profession on the subject all over the world is clear, beyond the shadow of a doubt.

We quoted some time ago in this column the Chicago diphtheria statistics, and we are glad to be able to give this week the New York statistics, each a striking contribution to the literature of the success of antitoxin therapy. The boards of health of the two cities have deserved well of the profession and of modern scientific medicine, for their work in the

collection and collation of the statistics, and for the thoroughly scientific manner in which the subject has been worked up and convincing conclusions evolved.

THE PLAGUE IN THE MIDDLE AGES AND NOW.

THE fearful epidemics of the plague which swept Europe at different times, from the Sixth to the Seventeenth Century, filled the public mind with a horror from which it has never freed itself, and which modern science has done little to remove. In the Middle Ages the people feared an unknown something lurking in the air or in the touch of the sick or in their food. They had good reason to fear it for it seized upon them in times of epidemic and after a few hours' illness they were dead. They filled their streets with smoke, they bore burning pitch and sulphur through the sick-rooms, they rubbed the walls of their dwellings with chalk, they washed their food in fresh water, they withdrew from all intercourse with their neighbors, and fled at the sight of a stranger, and if they had to go into the streets on some unavoidable errand, they wrapped themselves in flowing wide-sleeved robes which they could cast aside when they came to their own doors. Others rubbed themselves with oil, because it was believed that in Egypt oil-bearers seldom took the disease. Others followed the advice of Boccaccio and warded off the "black death" by laughter and song and jest. But merry-making in the face of death demands a lot of courage, and if that was lacking, it had to be gained by stimulants, so that the sound of revelry often mingled on the night air with the rattle of the hurrying dead-cart.

We pride ourselves on our scientific knowledge and our freedom from superstition. Men with bravery as true as that of the soldier charging up a hill against the fire of the enemy have tracked this black monster by caravan route and by ship back to its home in India and China, where they watched its comings and goings until in Hong Kong in 1894 they finally caught it and named it. It was once an unknown evil; now it is called "bacillus pestis." Familiarity with its manner of living and multiplying has begotten a certain amount of carelessness perhaps on the part of investigators, a carelessness which cost Vienna dear last fall when the death of a laboratory attendant who had charge of some ani-

mals which had been inoculated with the plague bacillus was quickly followed by the death of the physician and nurse who attended him, and all Europe knew that the plague had broken out in its very center. Vienna was in a panic, and the unreasoning fear and the hasty erection of barracks for the reception of possible victims to the disease, the burning of everything suspected of having come into contact with "bacillus pestis," the closing of all hospitals to students, and the appointment of royal commissions to consider ways and means of preventing the spread of the disease, all show that the superstitious fear of the Dark Ages is not dead, but only sleeping, and that a breath from Asia would arouse it to all of its former cruel activity.

Are we really in danger of such epidemics as have prevailed in past times? This momentous question is as yet without a satisfactory answer. Europe has had two great visitations of the plague, one in the middle of the Sixth Century, beginning in Egypt about the year 542, spreading through Constantinople where ten thousand people are said to have perished in one day, through Liguria, Gaul, and Spain, and ultimately all over Europe, having lasted a half century, during which time it caused the death of some millions of inhabitants. The second great epidemic was supposed to have originated in China in 1334, and after spreading through India and Persia, it reached Europe in 1347, and twenty-five million people fell before it during the next four years. Since that time there have been many epidemics especially in the Eighteenth Century, numbering their hundreds of thousands of victims but these epidemics have all been minor ones in comparison with the two great ones spoken of above.

If Europe has been free from this "black death" for nearly a century such has not been the good fortune of Africa and Asia. Little is known about the conditions of health in the centers of these two continents, but there is reason to believe that there are at least four regions where the "bacillus pestis" has its permanent abode, and from which it sallies forth from time to time to taste new blood. One of these is in Central Africa, one in Arabia, one in Mesopotamia, and one in Central Asia, from which the Chinese epidemics arise.

Whatever may be the means we possess to-day for the prevention of the spread of the disease, and as

they have not been fully tested it is not certain what their real value is, our means for curing those who fall sick with the disease are not much better than the Middle Ages possessed. It is estimated that in the Hong Kong epidemic of 1894 ninety-five per cent. of those who contracted the disease died. In other places the mortality has ranged from eighty to ninety per cent. There are no reliable records of the percentage of mortality of the epidemics of the Fourteenth Century, but it could not have been much worse.

It is encouraging that the recent outbreak in Vienna was so completely controlled. As far as it goes this speaks well for our knowledge of disinfection. Unfortunately it does not go very far toward proving our superiority to "bacillus pestis." The conditions were not ripe for its coming. It had been carried artificially under favorable conditions of warmth and moisture and nourishment in glass tubes from India to Vienna. It was an exotic there at that time, and no doubt was as tender as exotics usually are. At the times of epidemic the conditions for its growth everywhere out of doors have been favorable, else it could not have naturalized itself so rapidly. Hence it is unsafe to argue that because this sporadic development of plague did not spread further that a natural epidemic could be as easily stopped. There are men who have been fighting the plague in India for the last two years, who say that such would not be the case. They argue if the extraordinary powers given to the sanitary experts in India—powers which allow them to burn whole villages and to keep the inhabitants absolutely isolated—did not prevent the spread of the disease that Europe with its solidly built houses would be even more helpless before a real epidemic.

People often express surprise that any one can work in a laboratory with deadly germs of all descriptions and not contract some disease. To the initiated the habits and possibilities of attack of the different bacilli are as well known as are those of serpents or tigers to keepers of a menagerie. Occasionally by an accident some one falls under a lion's paw or an elephant's trunk, and in a similar manner some laboratory worker contracts diphtheria, or typhoid, or cholera. These happenings, however, are pure accidents, and neither the menageries nor the laboratories will ever close for the lack of men who are willing

to disregard a danger which owes its power to their own carelessness.

ECHOES AND NEWS.

The Plague at Alexandria.—Three cases of bubonic plague were reported at Alexandria, Egypt, July 9th. The inhabitants are said to be discontented with the sanitary precautions and threaten trouble if the disease continues to spread.

Tetanus in 1898.—There were seventy-three deaths from tetanus in Greater New York last year. Of the number twenty-three occurred in the Borough of Manhattan, thirty-four in the Borough of Brooklyn, and one in the Borough of the Bronx.

Bubonic Plague on Shipboard.—It is reported by wire that the "City of Pekin" is quarantined at Nagasaki, and the American "Maru" at Yokohama (both of the San Francisco-Oriental Line) with cases of bubonic plague aboard. Two deaths from this disease have occurred on the "Maru."

The Progress of Yellow Fever.—At Havana, Cuba, 2 cases of yellow fever were reported July 6th. At Santiago from June 15th to July 10th there were 148 cases and 28 deaths. Vera Cruz, Mexico, from June 29th to July 6th, 25 deaths. On the bark "Dolores Romano" at Vera Cruz July 1st 7 cases were discovered.

The American Electrotherapeutic Association.—This association will hold its ninth annual meeting at Washington, D.C., September 19, 20, and 21, 1899. Willard's Hotel has been chosen for the headquarters and special rates have been made for all interested in this meeting. Many able papers have been promised and a very successful scientific meeting is assured.

Scarlet Fever at West Point.—A slight epidemic of scarlet fever broke out among the cadets at West Point, July 11th. The prompt application of quarantine measures quickly brought it under control. During its sway the naval cadets from Annapolis on board the schoolship "Newport" arrived to pay a visit to the post. The quarantine rules prevented their landing, and they sailed away, without having grasped the hands of their brothers in the army. At last report no new cases had appeared, and the dress parades had been resumed.

The Buffalo Laboratory and the English Parliament.—In the English House of Commons, July 11th, in replying to a question of Sir Charles Cameron, the Parliamentary Secretary of the Foreign Office, said the attention of the Foreign Office had not been previously called to the fact that, owing to the deaths from cancer, the New York Legislature had endowed a laboratory at Buffalo to study the disease, but, the Under Secretary added, the British Chargé d'Affairs at Washington, would forthwith be asked to furnish the Government with all possible information regarding the institution. This recent interest

in the Buffalo laboratory has been aroused by the statement that investigations now being conducted there point strongly toward the confirmation of the germ theory of cancer. The somewhat startling statistics published last winter by Dr. Roswell Park setting forth the prevalence of cancer in New York State have been seriously questioned. Dr. Park informs us in a personal letter that in view of this fact, he is having his statistics carefully scrutinized in their minutest detail by experts preparatory to a subsequent statement.

Yellow Fever and Quarantine at Santiago.—General Wood in command of the Department of Santiago de Cuba is adopting heroic measures to stamp out yellow fever. An absolute quarantine against all officers and employees of the government, except those belonging to the department, has been established about the city. The mayor is directed to close all American hotels and saloons, to forbid liquor dealers to sell intoxicants to Americans, and to arrest all intoxicated Americans or loiterers in saloons. The principal hotels and saloons are designated by name. The pack-trains have been ordered to establish camps outside the city, and all the troops have been moved to Songo, except one company at Morro Castle. The headquarters of all the departments have been moved to Crispo, and the railroad and steamship lines are forbidden to bring Americans into the city. No ships are permitted to touch at the wharves. The strictest regulations have been established for the protection from fever of the soldiers at Morro Castle. Supplies are to be left at a road depot, and will be taken to the soldiers by teams from the camp. No travelers will be permitted to leave without having undergone five-days' detention in camp. On July 12th Captain Thomas M. Woodruff, adjutant of the Fifth Infantry, died near Santiago of yellow fever. Captain Woodruff was a native of the State of New York, but was appointed a cadet at West Point from the District of Columbia.

Letter from Major Harvard at Santiago.—Surgeon-General Sternberg has received a letter from Major Harvard, Chief-Surgeon at Santiago, which gives an interesting review of the yellow-fever situation there. The letter is dated July 5th, and says: "Fever broke upon us suddenly almost without warning, the first case in a dirty lodging-house in town, but the second and third cases almost simultaneously in the barracks. We have no doubt that the city is infected in various places, but especially in the barracks lately occupied by four companies and band of the Fifth Infantry, from which have come the great majority of our cases. The barracks and hospitals have been evacuated, as well as all other public buildings, and all our troops are in camps. The first two companies are now free from yellow fever, but the last two have continued to furnish many cases. On the 2d and 3d inst. these infected companies were disinfected, and sent into the foothills, five miles away, where we expect good results. Up to this evening we have about 104 cases, including 15 civilians, with total deaths of 23. Our general hospital is now under canvas, but I hope to be able to have a frame structure put up. All our cases with the

exception of a Cuban, and a Spaniard, are Americans, and as all our troops are out of the city we necessarily expect a prompt decrease of the epidemic for want of material to feed upon. I have nothing but high praise for all the medical officers on duty in this city."

Assignments of Volunteer Medical Officers to Regiments at Various Posts.—Volunteer officers of the Medical Department have been assigned to regiments as follows: To the Twenty-sixth Infantry, United States Volunteers, headquarters Plattsburg Barracks, N. Y., Major Charles F. Mason, surgeon; Captain Frederick A. Washburn, Jr., assistant-surgeon; First Lieutenant John E. Boyd, assistant-surgeon. To the Twenty-seventh Infantry, United States Volunteers, headquarters Camp Meade, Penn., Major Ogden Rafferty, surgeon; Captain James H. Hepburn, assistant-surgeon; First Lieutenant Leonard K. Graves, assistant-surgeon. To the Twenty-eighth Infantry, United States Volunteers, headquarters Camp Meade, Penn., Thomas C. Chambers, surgeon; Captain S. Chase de Krafft, assistant-surgeon; First Lieutenant Allen J. Black, assistant-surgeon. To the Twenty-ninth Infantry, United States Volunteers, Fort McPherson, Ga., Major Charles L. G. Anderson, surgeon; Captain James C. Minor, assistant-surgeon; First Lieutenant Lomax S. Anderson, assistant-surgeon. To the Thirtieth Infantry, United States Volunteers, headquarters Fort Sheridan, Ill., Major John R. McDill, surgeon; Captain James J. Erwin, assistant-surgeon; First Lieutenant Albert H. Eber, assistant-surgeon. To the Thirty-first Infantry, United States Volunteers, headquarters Fort Thomas, Ky., Major Joseph N. Henry, surgeon; Captain Abram L. Haines, assistant-surgeon; First Lieutenant Ralph L. Porter, assistant-surgeon. To the Thirty-second Infantry, United States Volunteers, headquarters Fort Leavenworth, Kansas, Major Frank C. Armstrong, surgeon; Captain John W. Hereford, assistant-surgeon; First Lieutenant William H. Cook, assistant-surgeon. To the Thirty-third Infantry, United States Volunteers, headquarters Fort Sam Houston, Texas, Major B. Albert Lieberman, surgeon; Captain W. E. Parker, assistant-surgeon. To the Thirty-fourth Infantry, United States Volunteers, headquarters Fort Logan, Col., Major James E. Shellenberger, surgeon; Captain Frank W. Foxworthy, assistant-surgeon; First Lieutenant Patrick J. McKenna, assistant-surgeon. To the Thirty-fifth Infantry, United States Volunteers, Vancouver Barracks, Washington, Major Julius A. Schuelke, surgeon; Captain Luther B. Grandy, assistant-surgeon, First Lieutenant John A. Metzger, assistant-surgeon.

MEDICAL MATTERS IN NEW YORK.

REPORT OF CONTAGIOUS DISEASES FOR THE WEEK ENDING JULY 8TH—A CHRISTIAN SCIENTIST IN BELLEVUE HOSPITAL—A DEATH FROM RABIES—THE STRAUS MILK DEPOTS—IMMIGRANTS REJECTED ON ACCOUNT OF DISEASE—DEATH OF DR. F. W. FABRICIUS AT SANTIAGO—RECOVERY FROM TETANUS—"CHRISTIAN SCIENCE" OR "EDDYISM."

THE Board of Health makes the following report of

contagious diseases in New York City for the week ending July 8, 1899: Measles, 216 cases, and 13 deaths; diphtheria, 191 cases, and 42 deaths; laryngeal diphtheria (croup), 10 cases, and 6 deaths; scarlet fever, 125 cases, and 7 deaths; smallpox, 3 cases, and 1 death; chicken pox, 12 cases; tuberculosis, 98 cases, and 140 deaths; typhoid fever, 16 cases, and 10 deaths; cerebrospinal meningitis, 4 deaths.

In some inexplicable way a man who claimed to be a Christian Scientist, an "Eddyite" or "Divine Healer" and able to cure every disease afflicting the patients, got into Bellevue Hospital one day last week. He told the patients that the attendant physicians at the hospital were their worst enemies, and were merely experimenting on them for the benefit of the higher classes. The man had elaborately printed cards, on the back of which were crosses in red, and "P. J. Durvin, 285 Bowery," also the announcement that he and the Savior were able to cure every manner of disease. Durvin succeeded in passing through several of the wards before he was interrupted. It is said that he then left the hospital by the "most direct route." The patients were all more or less excited over the visit.

Charles N. O'Neil, four years of age, living at Montclair, N. J., was bitten in the face by a dog June 1st. The following day he was taken to the Pasteur Institute in this city, where he was treated by inoculation. The crisis had been passed and recovery seemed certain, when the boy developed marked symptoms of rabies and died July 16th.

The Nathan Straus milk depots have been opened at various points in the tenement-house districts and on the recreation-piers. Pasteurized milk and fresh milk cleansed by the centrifugal process is sold by the glass for one cent, and pure and modified Pasteurized milk are furnished in bottles for infants at nominal rates, or free to those too poor to pay.

The medical examiners at the port of New York, during the month of June, 1899, examined 30,754 immigrants. Of these 126 were rejected as suffering from loathsome or contagious diseases.

Acting Assistant-surgeon Frederick W. Fabricius of the United States Army, formerly a practising physician in this city, twenty-six years old, died the death of a hero at Santiago de Cuba on Sunday, June 25, 1899. When yellow fever first made its appearance among the American troops, Dr. Fabricius, although not an immune, plunged into the work of life saving with such energy that he soon exhausted his physical powers, and within a week fell a victim to the dreaded disease. He died five days after he had been attacked by the fever. Dr. Fabricius was graduated from the Bellevue Hospital Medical College, class of 1893, and was an interne at Bellevue from 1894 until 1896. He was afterward connected with the Metropolitan Hospital for the Insane. When war began between the United States and Spain the young physician offered his services to the government, and was appointed acting assistant-surgeon in the army. He was first stationed at Fortress Monroe, Va., and last December was transferred to Santiago de Cuba,

where he held the position of pathologist and bacteriologist at the United States General Hospital up to the time of his illness. Dr. Fabricius was unmarried. He had a brother and an uncle living in this city.

Joseph Reinberg, twelve years of age, one of the victims of the Fourth of July fireworks, who had received serum treatment, both intracerebral and subcutaneous, was reported July 17th as convalescent. Some of the firecracker wadding which was taken from the wound in his hand has been sent to the laboratory of the College of Physicians and Surgeons for examination as to the presence of tetanus germs. There seems to be reasonable grounds for the belief that the pulp from which firecrackers are manufactured is made from the dirty scraps of paper collected from the streets, and therefore supplies the source of tetanus infection.

A much-advertised meeting of the Medical and Legal Relief Society was held at the Waldorf-Astoria on the evening of July 13th to take steps toward devising a bill for presentation in the New York Legislature to restrain the practice of Eddyism or Christian Science. The movement was evidently ill-advised and improperly organized. The members of the society and the representatives of the medical profession were conspicuous by their absence. The meeting was captured by a strong representation of Eddyites, and the effort resulted in a fiasco. As Mr. W. A. Purrrington pointed out in a recent letter to the *New York Sun*, it seems obvious that attempts at legislation in the matter should not be made ill-advisedly or without due organization. In confirmation of this Mr. Purrrington narrates the history of an effort made in 1898 by Senator Coggeshall to secure the passage of a bill that would have restricted the practice of Eddyism. At its hearing in committee so many Eddyites, most of them in skirts, were present that adjournment was had to the Senate Chamber. Apparently no one spoke for the bill and no one of note against it. After the usual platitudes concerning liberty and the customary depreciation of medicine as an unfinished science, the Senator is reported to have smiled, bowed to the ladies, and abandoned the bantling upon Mrs. Eddy's doorstep as cheerfully as he took it from its parent, whoever that may have been. It was another instance of an enthusiastic and organized few carrying their point, while the unorganized multitude was indifferent and apathetic.

Mr. Purrrington's letter is so clear upon the relation of existing law to Christian Scientists that it seems quite worth while to quote freely from it. He says: "No medical law of any State enjoins or prohibits any system of medical practice. No law forbidding the practice of Christian Science or any other system of treating the sick, no matter how foolish, has been proposed. Those who assert the contrary do so ignorantly or with intent to mislead. What medical laws require, and in the opinion of the Supreme Court of the nation and of almost every State properly require, is that no person shall practice medicine before he has pursued a proper course of study and furnished some evidence that he has a fair knowledge of the human economy and the sciences relating thereto. This regulation applies to Roman Catholics, Protestants, and Jews. It is objected to by Christian Scientists and

Spiritualists, who stoutly maintain that to require the same education of them as of others engaging in the same business is to infringe their liberty of conscience and right to worship in their own way, although it is undeniable that when a man has once obtained a license to practice medicine upon proof of his scientific attainments he may follow any system he chooses. He may, if he sees fit, rely solely upon mental processes. Every physician does largely take into account and rely upon the effect of the mind upon the body, especially in certain classes of cases. There are few to-day who pretend that the high potencies of homeopathy have any medicinal action, and it was a realization that their effect was due to the patient's imagination that led Mrs. Eddy, as she says, into her own extraordinary system. But homeopaths admit the existence of disease. They often administer drugs as heroically as regular practitioners—sometimes more heroically. They use surgery skilfully. In fact, it is often difficult to differentiate them from regular physicians by their practice alone; nor was there ever a time when they did not claim to be called physicians. The Eddyites, on the other hand, although eager to dub themselves 'doctors of Christian Science,' declare that they are not practitioners of medicine. Mrs. Eddy, as was fully pointed out in the *North American Review* for March, condemns not only drugs, remedies, and instruments, but even hygiene, exercise, and bathing. Her method of curing disease is first to deny its existence and then to argue with it as one would argue with a Congressman. Herein lies at once the danger of her crazy method and the immunity of its practitioners from punishment under the law of this and many other States. A druggist who prescribes a proprietary nostrum or so simple a remedy as rhubarb or chalk mixture may be convicted of a misdemeanor. Our Supreme Court has so held in several cases. But it also has laid down in *Smith vs. Lane* (24 Hun., 632) the narrow rule that the use of drugs, medicines, or instruments is an essential element of medical practice, holding, in substance, that the medical law was intended only to protect those seeking treatment *secundum artem* from false pretenders to skill in the use of dangerous drugs or instruments, but not to protect from their mistake or folly, persons who, lured by wonderful promises of cure, submit themselves to the treatment of those avowedly discarding ordinary medical methods. This case, expressly approved of in Ohio, Rhode Island, and perhaps other States, is the joy and bulwark of Christian Scientists. It was held to be inapplicable under the Nebraska and Illinois statutes; but from the last Legislature of the latter State the Eddyites are said to have secured a proviso, in the new medical law adopting its rule.

"It will be remembered that a letter in the *Sun* of June 9th, the accuracy of which has not been denied to my knowledge, showed that when Mr. Carol Norton, Mrs. Eddy's apostle hereabouts, was asked if he would dare to exclude medical aid and treat severed arteries, fractures, strangulations, and contagious diseases by mental processes he twice wrote that he preferred to shelve the questions. It must seem startling to a layman

that a druggist violates the medical law by prescribing rhubarb, while a Christian Scientist who 'thinks at' the severed artery of a child is exempt from the operations of that statute.

"But does it follow that we are without remedy under existing law? It would seem not. If it can be demonstrated that a Christian Scientist has caused death by excluding proper medical or surgical treatment and substituting his mental processes—in such cases, for instance, as those submitted to Mr. Norton and 'shelved' by him—it ought not to be difficult to obtain a conviction of manslaughter, if not of murder. The societies for prevention of cruelty to children can act in the premises. English courts are extraordinarily lenient with fanatics, but although Wagstaffe escaped punishment prior to the enactment of the Prevention of Cruelty to Children statute, that law seems to have been passed in consequence of his acquittal; and recently another member of the 'Peculiar People,' whose child died under a similar treatment by anointing with oil in Apostolic fashion, was convicted of manslaughter. If memory serves, Mr. Gerry, some years ago, took from a missionary a child whose fractured arm the father was treating solely by such anointing; and the bishop forbade the parent to go back to his post. There is no reason why Christian Scientists should not be compelled to report births, deaths, and contagious diseases under the usual penalties for disobedience. If they say that it is wrong to compel them, who do not believe in disease, to report its existence, once more the answer is simple: Mrs. Eddy herself has reported in print that her first husband, Colonel Glover, died of 'yellow fever,' that insidious disease. But after all, that which will destroy Christian Science is the true exposition in the reviews and daily press of its absurdities, its vulgarities, its false pretences, as well as its dangers. It does not seem possible that a sane or reverent mind or one with any sense of humor could accept seriously the preachment of the exceedingly shrewd, but very ignorant and ungrammatical old lady, once of Lynn but now of Concord. And it is safe to say that unless Christian Scientists can win some temporary advantage by cheap martyrdom the time will come very soon when sane and reputable persons, many of whom now accept the doctrine ignorantly, will blush with shame to think they ever could have been disciples of Mary Moss Baker Glover Patterson Eddy, whose name seems to be legion."

MEDICAL MATTERS IN PHILADELPHIA.

A LAW TO PREVENT POLLUTION OF THE SCHUYLKILL RIVER—LICENSES FROM OTHER STATES DO NOT QUALIFY THE HOLDER TO PRACTISE MEDICINE IN PENNSYLVANIA—MORE "FAITH-CURE" NOTES—TETANUS RESULTING FROM FIREWORKS' INJURIES—THE BOARD OF WATER EXPERTS—DIPHTHERIA IN SOLDIERS' UNIFORMS—DR. CATTELL ELECTED PATHOLOGIST TO THE PHILADELPHIA HOSPITAL—APPOINTMENTS OF MEDICAL MEN BY GOVERNOR STONE—PERSONAL.

AT the thirty-third annual meeting of the Pennsylvania State Board of Health, held this week, a regulation was adopted for the prevention of pollution of the Schuylkill

River. The new regulation, which is based upon power recently vested in the State health authorities by an act of legislature, absolutely prohibits the pollution of this stream by deposits of excrement of all kinds, from any source whatsoever. Recent official investigations having shown the presence of widespread contamination of the Schuylkill by the sewage of dwellings, institutions, and manufacturing situated along its banks, the importance of the new order can scarcely be exaggerated. The board, now that it possesses the power to do so, will at once begin the work of abating the nuisances, by rigorous enforcement of the new law; and, it is to be hoped, without fear or favor of either individuals or of corporations.

Congratulations should be extended to the Pennsylvania State Medical Council for its recent successful efforts in the courts to uphold the standard of legal requirements for the practice of medicine in this State. In a suit which was decided this week by Judge Simonton, a mandamus was refused compelling the Medical Council to issue to a Dr. George A. Ludwig, a license to practise medicine, without the necessary qualification of examination. The physician in question is a graduate of a Baltimore medical school and a licentiate of the Maryland Medical Examining Board, and he applied for a license in this State on such credentials. The license was properly refused, so he carried the question to the courts, evidently to test the legality of the Medical Practice act of this Commonwealth. Judge Simonton, in refusing to grant the mandamus, based his decision upon the fact that the medical law of Maryland, under which the petitioner was qualified, fails to meet the demands of the medical law of Pennsylvania. This decision should form a valuable precedent, to deter, in future, licensed physicians from other States where the qualifications may happen to be trivial, from attempting to evade the Pennsylvania law, by presenting such credentials in lieu of standing the regular examination required in this State.

It becomes painfully monotonous to have to record, week after week, the far-reaching evils of the "faith-cure" and allied insanities in this vicinity, but once again your correspondent feels called upon to note still another death from the practise of the delusion. This time it is the case of a young child, now dead of scarlet fever, whose father not only refused to call in medical attendance for the little one, but even failed to report the illness to the health authorities of the town. The father, Jacob W. Gracely, by name, is reputed to trust rather to the Lord than to physicians for the treatment of disease, and he is himself following out this line of belief in his own case, for he is also ill. The authorities of Allenton, where this individual lives, have placed him under arrest, not for believing in the Lord, but for violating the law requiring the notification of contagious diseases, but sentence has been suspended pending the prisoner's indisposition.

More "faith-cure" news comes from a small borough in Chester County, to the effect that a petition, signed by most of the residents of the place, has been presented to the local school-director, requesting the reconsideration of the appointment of a school-teacher who is alleged to hold firmly implanted Christian Science views. It is

stated that the teacher complained of has openly advocated the teachings of this sect, made "converts" to the faith, and aired her views of the question in the school-room. The school directors are divided about the removal, and the deadlock may have to be broken by the courts.

Contrasted with New York City, where such an epidemic of tetanus has followed the Fourth of July, Philadelphia may consider herself exceedingly fortunate. This city has not escaped, however, as the five fatal cases of tetanus from injuries by fireworks testify. In addition to these, there are several other cases, convalescents, or of mild infection. Judging from the large number of accidents suffered by Fourth of July celebrators in Philadelphia, the number of tetanus cases has been few.

The three water-experts appointed by the mayor, Messrs. Rudolph Hering, Samuel H. Gray and Joseph M. Wilson, have just visited Albany, N. Y., where they inspected the model 15,000,000-gallon water-filter, considered one of the best-constructed plants in the world. As yet, the experts have not advanced any definite plan of water-purification for this city, and their decision in the matter will not be arrived at until after extensive inspections of water works in various parts of the country and until after careful consideration of every phase of the question. The public prints are full of all sorts of rumors attributed to the board of experts, but their endorsement of any method of water-supply suitable for this city will remain problematic until the publication of their official report to the mayor.

Owing to the vigilance of the factory inspectors and the health authorities, a quantity of soldiers' uniforms ready for delivery to the Schuylkill Arsenal this week, were found to have been exposed to infection by diphtheria; the articles of clothing were immediately confiscated and sent to the disinfecting-station for sterilization. This is the second instance of diphtheria-infected clothing which has been reported in this city within a fortnight, and the detection of the danger testifies to the watchfulness of the factory inspectors, who made the discovery in both instances.

At the last meeting of the Board of Charities and Correction, held this week, Dr. Henry W. Cattell was elected pathologist to the Philadelphia Hospital to succeed Dr. John Guiteras, who recently resigned.

Governor Stone has announced the following appointments of medical men during the past week: Dr. J. L. Forwood of Chester, to be a member of the Quarantine Board for the port of Philadelphia, vice Dr. Ernest La Place, whose term expired July 1st, and Drs. John H. Gibbon of Philadelphia and Herbert A. Arnold of Montgomery County, to be assistant surgeons of the National Guard of Pennsylvania, with the rank of first lieutenant, with assignments to the Sixth Regiment, Infantry. Governor Stone has also commissioned as medical officers of the National Guard Major Francis R. Packard, surgeon, and Captain R. W. Montelius, assistant-surgeon, both with rank from June 14, 1899; and Lieutenant Walter Boardman, assistant-surgeon, with rank from July 11, 1899.

Among the medical profession of this city nearly "every one who is any one" seems to have joined in the midsummer rush Europeward. Among the latest departures and those who expect to sail during the next few days may be mentioned Drs. James C. Wilson, J. Montgomery Baldy, G. Hudson Makuen, Solomon Solis-Cohen, Howard F. Hansell, and M. S. French. Dr. Henry C. Chapman, who has been abroad since early last spring, is expected to return the latter part of August.

The number of deaths in Philadelphia during the week ending July 15th reached a total of 482—an increase of 47 over those of last week, and a decrease of 11 from those of the corresponding period last year. Returns of contagious diseases are as follows: Enteric fever, 40 new cases, with 9 deaths; diphtheria, 64 cases, with 17 deaths; scarlet fever, 35 cases, with 2 deaths; and cerebrospinal meningitis, a single case, and 2 deaths.

SCIENTIFIC MEDICAL JOTTINGS FROM AMERICAN TROPICAL COUNTRIES.

CARRION'S DISEASE.

A DISTINCT contribution to South-American medicine is the recent publication of a volume on "La Maladie du Carrion" by a friend of the martyr scientist, whose heroic inoculation of himself, unfortunately with fatal result, has added so much to our knowledge of the disease.

The disease has been known as long as history goes back in Peru. When the Spaniards under Pizarro landed in the country they were stricken with it. It has been known by many names, nearly all of them having reference to its occurrence in Peru, or at least in the Andes Mountains. It has been called verruga des Andes and verruga Andicola, the wart of the dweller in the Andes; verruga de Castille, because of its occurrence among Spaniards when first brought to European notice. The new name proposed for it, La Maladie du Carrion, seems to be a worthy tribute to the fearless young investigator who made the true character of the disease known, though his inoculation of himself cost him his life.

During the building of the railroad from Lima to Oroya a number of the workmen were prostrated by a fever that often proved fatal. It was practically always complicated by a cutaneous eruption resembling that of verruga Peruana, and it was a matter of great doubt as to whether two diseases coexisted. It was thought that the fever might be a serious form of malaria during which, owing to lack of resistive vitality, the verruga Peruana succeeded in getting a foothold. Carrion, a medical student, inoculated himself with material taken from one of the cutaneous lesions and is considered to have demonstrated that the fever and the eruption were symptoms of one and the same disease. He developed a cutaneous eruption and a very high fever which proved fatal on the thirty-ninth day. He had the satisfaction of knowing before his death that he had solved the problem of the identity of the two diseases.

As the disease may last for months in certain chronic

forms it would seem that physicians on our seaboard should know something of it as they are liable to meet with examples. The eruption occurs in two forms, a miliary and a tubercular or, as they say in Spanish, mular form. The miliary form is not unlike prurigo at times or sudamina, though the little indurated nodules which are very superficial may become umbilicated and so resemble variola. It may be localized when it occurs on parts especially subject to irritation, as the face, hands, and feet, and the knees and elbows. Often it is universal. The tubercular form occurs as nodules at first to be felt rather than to be seen in or under the skin and later reaching good size, sometimes as large as a small orange. These large nodules sometimes retrogress but oftener form adhesions to the skin and break down. Fever always occurs, sometimes just after the eruption. The height of the fever seems to depend on the amount of the eruption. Plentiful external eruption relieves the system of toxins by elimination as it were. The nodules have been found on the serous membranes and in all the internal organs, even in the bladder and testicle, and in Peyer's patches. The fever is often of quotidian type, with afternoon elevations; sometimes, however, it is of tertian type, and it may at times be very irregular, but it never fails to make its appearance some time in the course of the disease.

SANARELLI'S BACILLUS NOT THE CAUSE OF YELLOW FEVER.

Dr. A. Matienzo in the *Gaceta Medica*, the periodical of the National Academy of Medicine of Mexico, Vol. XXXVI., No. 10, in a note on the bacteriology of yellow fever gives the details of six cases of the disease in which he sought carefully, and with the technic advised by its discoverer for Sanarelli's bacillus but failed to find it in any one of the cases.

In conclusion, he says: The bacillus claimed by Sanarelli as the cause of yellow fever, and whose presence cannot be demonstrated after repeated investigations such as I detail here is evidently not the true cause of the disease. Sanarelli himself admits that it cannot be found in nearly one-half the cases, and this flagrant violation of Koch's law of pathogeneity should be enough to condemn the idea of its specific etiology for yellow fever. Novy, working under Roux at Paris, has shown recently that Sanarelli's bacillus by its acid reaction with tournesol and its production of gas in glucose solution resembles the colon bacillus, though it has certain similarities with the bacillus of Eberth that seems to show that it belongs rather to the family of the typhoidal bacillus.

The most important fact that speaks against its specific pathogeneity for yellow fever is that its vitality is not inhibited in the least by exposure to a temperature of fifteen degrees below zero, and that this exposure does not even temporarily paralyze its germinative powers.

Dr. Matienzo agrees finally with Novy that the germ of yellow fever, very probably like that of hydrophobia and other well-known diseases, is so small that it is beyond the power of the best lenses we have at present; that it is "in the realm of the infinitely little."

MICROBES AND THE SCENTS AND COLORS OF FLOWERS.

According to *La Nature*, Dr. Domingos Freire, the well-known yellow-fever expert of Rio Janeiro, and whose inoculations with yellow-fever serum have attracted so much attention, claims to have found that most of the flowers harbor micro-organisms of various kinds. Some of these microbes are startlingly similar to some of the pathogenic varieties of bacteria. Dr. Freire expresses the opinion that the presence of these bacteria is not merely a passing incident in the life of the flowers but that they are intimately associated biologically with them as hosts. He thinks that a sort of symbiosis exists and that the color and scent of the flowers are really due to bacterial parasites that flourish on them. He has found without doubt that in certain cases at least, a microbe can be cultivated from the surface of a flower, which in culture media reproduces the color of the flower or one very similar to it. He has found, for instance, a pinkish leptothrix that grows on the Rosa Rothschild which is always of a pink color. In the same way he has demonstrated that the odors of flowers may be reproduced in cultures of microbes obtained from them.

Dr. Freire considers that some at least of the bacteria that he finds so commonly on flowers may be pathogenic for man. Certain forms he has not been able to differentiate from well-known pyogenic microbes. The bacillus pyocyaneus seems to occur in connection with certain tints. Very often he has found on flowers certain micrococcic forms resembling the ordinary pus-cocci, which he considers have been deposited there from the air and either have been able to reproduce themselves or at least, have retained their vitality. As they are by no means infrequent and as the flowers possess ample opportunities for the collection of floating micro-organisms from the air and as especially such as are grown during the winter months in warm living rooms, are continually in the midst of conditions of heat and moisture that would favor the multiplication of microbes. Dr. Freire advises against close contact with such flowers especially by delicate persons. It is this property of microbe cultivation it would seem, rather than any supposed noxious organic product that is thrown off from them that constitutes the real danger of having flowers in living rooms.

BACTERIA AND TOBACCO.

An almost as surprising development of bacteriology is that touched on by Nuttall in the June number of the *Contemporary Review*, but in this case it is as helpful agents that they are found at work. Certain observations in Cuba and Florida seem to make it clear that during the time that tobacco is maturing after being cut down there is a development in it of bacteria. It is this that raises the temperature of the tobacco and if it is allowed to proceed too far will spoil the leaf. The growth of these bacteria produces the characteristic qualities of the special form of tobacco, and in the tobacco of different countries it is not so much the varieties in the tobacco plants themselves or the conditions of moisture, soil, and climate under which they have grown as the varieties of colonies of bacteria that develop on

it which makes the ultimate differences in the mature product.

COMPARATIVE MILDNESS OF PURULENT OPHTHALMIA NEONATORUM IN WARM CLIMATES.

Dr. J. S. Fernandes in the June number of the *Gaceta Medica* of the National Academy of Medicine of Mexico reasserts, as the result of observations and comparisons made during the last ten years, that the disease type of purulent ophthalmia (gonococcal) of the new-born is much milder in warm climates than it is in Europe. This was asserted some time ago at the Paris Society of Ophthalmologists, but was received with some incredulity. Dr. Augustin Chacon found it to be the fact in Mexico and now Dr. Fernandes confirms it for Havana. In many cases the gonococcus was found, yet, in some of these patients under the ordinary treatment for catarrhal conjunctivitis, they were on a fair way to recovery. The complications and serious sequelæ were much rarer than in Europe. We do not know that it has ever been noted in temperate climates that purulent ophthalmia neonatorum is less virulent in the summer time, yet this ought to be the case if it is the temperature alone of warm climates that causes the difference in the types of the disease. Dr. Fernandes suspects that there are other factors at work though he is not able to designate them very definitely.

TRANSACTIONS OF FOREIGN SOCIETIES.

French.

CACODYLIC MEDICATION—PENETRATING WOUNDS OF THE CHEST—ANOTHER CANCER PARASITE—MOVEMENT OF THE RIBS IN PLEURISY—CASTRATION FOR TUBERCULOSIS OF THE TESTICLE—SUTURE OF TWO FRACTURED CLAVICLES—TUBERCULOSIS OF THE SPLEEN—SYPHILITIC GLOSSITIS IN A WOMAN.

AT the Academy of Medicine, June 6th, GAUTIER said that he had used cacodylate of soda in profound anemia, in malarial cachexia, and in many cases of confirmed tuberculosis. Although cacodylic acid contains 54.3 per cent. of metallic arsenic, it is certain that the cacodylate of soda is not an ordinary arsenical compound. It causes the fever of phthisis to fall slowly but steadily, at the same time that it promotes assimilation and increases the patient's weight. The stomach will support indefinitely a daily dose of from $1\frac{1}{2}$ to 3 grains and almost the same amounts may be administered subcutaneously to an individual who cannot take without disturbance $\frac{3}{100}$ of a grain in Fowler's solution. This difference in poisonous action between organic and mineral arsenic is explained by the experiments of Bearedka who found that mineral arsenic injected into the peritoneum or under the skin is absorbed by the leucocytes and passed on in an organic form to the other cells of the body, especially those of the nervous system. If mineral arsenic is injected so that it comes into immediate contact with the nervous centers, before it can be changed by the leucocytes, it is found that the fatal dose is only the one-hundredth part of the amount which is fatal if the drug is first changed by the leucocytes.

The cacodylates are irritating in large doses, stimulat-

ing in therapeutic doses. They excite reproduction of the lymphoid corpuscles, especially the polynuclear ones, which protect us from infectious bacteria and their products, and cause the rapid multiplication of the red corpuscles. Cacodylic medication, therefore, appears to be an excellent remedy to regulate oxidization and consequently to renew the blood and tissues. In phthisis the cacodylate of soda should be given hypodermically in doses of from $\frac{1}{2}$ to $\frac{3}{4}$ of a grain daily. This medication should be continued daily for a week and then omitted for a week, to be resumed if the appetite begins to fail or the temperature to rise.

ROBIN thought that cacodylic medication should not be classed with arsenical as the action of the former excites, and that of the latter restrains organic changes.

GAUTIER said that the restraining action of arsenic follows large doses. In minute doses its action is also an excitant one.

At the session of June 13th DELORME, in speaking of the treatment of penetrating wounds of the chest, laid stress upon the good effects of absolute quiet, antiseptic dressing of the wound and, according to circumstances, the administration of morphin, ether, caffein, etc. On account of the excitement usually attendant upon a shot from a pistol, morphin is particularly beneficial to quiet the nervous condition. The patient should not be moved for some days.

Artificial serum for loss of blood is a valuable restorative, but it should be injected slowly lest it cause pulmonary congestion and increased respiration, and so bring about fresh hemorrhage. If hemothorax threatens life, the chest should be opened and the hemorrhage stopped by ligatures or tampons. On account of the danger of infection from the bronchi, pneumothorax after a penetrating wound of the chest demands immediate surgical interference.

LUCAS-CHAMPIONNIERE entirely disagreed with Delorme's treatment of hemothorax. In such conditions the additional traumatism of an operation may readily cause death, while apparently hopeless cases if left to themselves, may recover.

At the Academy of Sciences, May 23d, CHEVALIER said that he had isolated a fungus from cancers which could be cultivated in bouillon made from a cow's udder and in other media. The microscopic appearances of the molds varied greatly according to their age and the medium employed. Inoculations of the cultures into the skin of guinea-pigs, rabbits, and dogs produced not only local tumors, but secondary visceral nodules and a general cachexia. Microscopically the tumors resembled sometimes sarcoma, sometimes fibrosarcoma, sometimes carcinoma. In spite of these facts Chevalier hesitated to announce as yet that this fungus was the cause of the original tumors in man from which it was isolated.

June 12th, BOUCHARD and GUILLEMINOT reported that by means of the X-rays they had ascertained that in recent unilateral pleurisy, the ribs of the affected side move less, and are held more obliquely than on the well side. In chronic pleurisy and in long-standing unilateral phthisis, this obliquity still more increased. In persons

so affected the range of motion of the ribs is much decreased so that respiration becomes largely abdominal even in women.

At the Surgical Society, May 31st, DELBET spoke of the advantages and disadvantages of castration in tuberculosis of the testicles. In seventeen out of twenty cases which he had examined, the disease was limited to the epididymis. It followed that indiscriminate castration was not to be advised. On the other hand, the three cases showed that it is sometimes necessary. He admitted the favorable influence of castration upon tuberculosis of the seminal vesicles and prostate, but a similar good effect may follow an epididymectomy for tuberculosis. None of these reasons, therefore, warrant the removal of a sound testis, which will continue functionally active, if its vessels remain, even though its excretory duct be removed. Removal of both epididymes does not necessarily produce impotence. The best incision is an anterior one opening into the tunica vaginalis. The testicle can then be examined and the diseased portions removed.

POIRIER said that a patient whom he had reported to the society as a case of cure of tuberculosis of the seminal vesicles still had the disease, as a recent examination showed. In five cases he had removed nodules from the epididymis only to find other nodules a few weeks later. Hence it is desirable to make a high incision and to inspect the whole epididymis and vas deferens. Many times it will be found desirable to remove these structures in their entirety.

At the session of June 7th, GUINARD discussed two cases of fracture of both clavicles by direct violence. Pluyette, the surgeon in charge of one patient, a young man of twenty-two years of age, made an immediate resection and suture of the left clavicle, and a month later the right one was treated in the same manner, as it had thrown out an enormous callous. The result on both sides was satisfactory. Guinard considered that the condition of the other patient precluded any operative effort. Two months after the accident, the man left the hospital with union of both bones, but with an enormous callous. He held that suture should not be performed immediately but should be reserved or postponed until it is plain that there is a defective callous or a false joint.

At the Medical Society of the Hospitals, June 2d, WIDAL described a peculiar type of tubercular enlargement of the spleen, characterized by an especial group of symptoms, and to which attention has not yet been called. The patient in question began to suffer from pain in the left hypochondrium at his thirty-first year. Later a tumor slowly developed, which grew till it reached the inguinal region, and occupied the whole left half of the abdomen. It was hard and lobulated. The patient died in eight years, never having had ascites. There were two cardinal symptoms, however, a cyanosis, manifest especially in the extremities and face, and an increase in the red blood-cells to about 6,200,000 and of the white ones to 6,000. There was no modification in the numerical relation of the different kinds of white corpuscles. At autopsy the spleen was found to measure twelve inches in length and to weigh over seven pounds. There

was scarcely any splenic tissue remaining, the whole organ being composed of tubercular nodules and sclerotic tissue. Microscopical tubercles were found in the liver, pancreas, and kidneys.

MOUTARD--MARTIN saw a case of primary tuberculosis of the spleen, in which there was an increase in the blood-globules, but no cyanosis.

ACHARD also mentioned a case of primary splenic tuberculosis.

At the Society for Dermatology and Syphilography, June 8th, NELATON said that the sole radical treatment of lupus is to remove it, making an incision beyond the diseased tissue as if for cancer. He had employed in a number of instances scraping and cauterization, but he had obtained a complete cure in only one instance, a case in which the lupus was upon the buttock.

BALZER showed a female patient with a glossitis in the third stage of syphilis. This trouble is very rare in the female, only 2 out of 850 syphilitic women being so affected according to Barthelemy.

FOURNIER said that this difference in sex is inexplicable. The tongue is best treated by injections of calomel. Sometimes the injections will cause the lesions to disappear. The use of corrosive sublimate is not to be recommended, as it may injure the teeth.

SOCIETY PROCEEDINGS.

THE AMERICAN PEDIATRIC SOCIETY.

Abstract of the Proceedings of the Eleventh Annual Meeting, Held at Deer Park, Maryland, June 27, 28, and 29, 1899.

DR. WILLIAM P. NORTHRUP of New York, President of the Society, called the meeting to order at 10 A.M. He took for the subject of his address "The Teaching of Pediatrics." He said, in part: The American Pediatric Society is made up largely of teachers of pediatrics, and the discussion of the methods of teaching this subject are worthy of consideration at this time. We may ask, What place should the subject of pediatrics have in the curriculum? What number of lectures and what amount of time should be given to this subject in an undergraduate course? In answering these questions I must draw upon my own experience. In the whole scheme of instruction we may admit the primary importance of general medicine, general surgery, and obstetrics, and then pediatrics shares with gynecology the second place. Our course in instruction at present includes didactic lectures, clinics, and section-teaching. There is a wave of sentiment against didactic teaching and no doubt the reaction against the former complete dissertations on disease is justified, but the didactic lecturer has yet a function, which is to present to the beginner the salient points of a subject, to give the essentials of a subject. Certain diseases must, in addition, be seen clinically in order to understand them, and in addition to the regular clinic, attended by all, there should be section-teaching so that the student may get very near the patient, and if possible each student should be allowed to repeat the demonstra-

tions. In this way gavage, lavage, lumbar puncture, etc., can be best taught.

He then described what he considered the best arrangement of hospital rooms and wards for teaching purposes, and gave a list of diseases that should be taught entirely by the chair of pediatrics. He was enthusiastic about the value of a stereopticon for teaching purposes. In regard to the status of a teacher of pediatrics he said that in their school the professor of pediatrics is not a member of the governing faculty but both he and his chief of clinic receive a salary.

In the discussion which followed DR. ROTCH of Boston said: In the early history of Harvard University very little time was given to the teaching of pediatrics, but the importance of the subject has gradually become more fully recognized until it now holds the same position as any of the other branches of clinical medicine or surgery. There is continuous teaching from October to June, and five exercises a week are given. The teaching is divided into didactic lectures, clinical instruction, and what we call clinical conferences. The ward-material is used in connection with that of the out-patient department. The examination in pediatrics is compulsory. We also use the lantern and slides and find this a most valuable means of instruction. At the beginning of the course the time is devoted to teaching the students what is especially distinctive of the early years of life, and having been well grounded, first in what a healthy child should be, they are then taught about the diseases. At the clinical conferences one of the students reads a paper on some case which he has been asked to work up, and the paper is discussed first by the students and then by members of the staff. The professor of pediatrics holds a chair in the faculty on an equality with any other member of the faculty and receives a salary.

DR. J. P. C. GRIFFITH of Philadelphia: We are not as progressive in Philadelphia as they are at Harvard, but we are gradually recognizing the importance of pediatrics. At present pediatrics is an elective study at the University of Pennsylvania, but I am glad to say that I think most students recognize the importance of this branch of medicine. In teaching I follow very much the plan described by our president in his paper.

DR. HENRY D. CHAPIN of New York: My work has been mostly with post graduate students, and I find that a large number of them are not well grounded in the principles of pediatrics. I think this is largely due to the fact that college authorities have not appreciated the importance of pediatrics and have not given it the proper place in the curriculum. It should not be tacked on to obstetrics or to gynecology, nor should it be treated as a specialty. It should be taught as a branch of general medicine.

DR. BLACKADER of Montreal: It has been my custom to devote my didactic lectures mainly to a consideration of infantile development and the different ways in which a disease manifests itself in the child as compared with the adult. The teacher in McGill University is associated with the chair of medicine, is not a member of the faculty and has no emoluments.

DR. S. S. ADAMS of Washington: I think the matter of proper recognition does not rest so much with the colleges as with the men themselves. If they insist upon proper recognition they will receive it.

DR. COTTON of Chicago: At Rush Medical College we have just adopted a plan by which the junior students are to be thoroughly drilled in the preliminaries and the seniors are to be given actual clinical experience.

"The Increase of Weight in Infants Fed Artificially" was the title of a paper by DR. HENRY KOPLIK of New York. He said: During the past nine years I have conducted in connection with my dispensary clinic a laboratory for the artificial feeding of infants and for the purposes of the present study infants below the age of nine months were observed, and as many collected as would remain under observation for a protracted period. I have studied, first, infants fed from birth, or nearly so, with a modified cow's milk; second, infants fed with breast and cow's milk. The modified milk supplied to these infants was in all cases the same, being composed of cow's milk diluted with an equal part of distilled water and with six per cent. of sugar of milk added. Infants below three months received three ounces of this mixture; above this age an ounce was added for every month until eight ounces was reached, when full milk was administered. The infants were then systematically weighed. In some of the older children, who did not prosper on this Heubner-Hofman mixture, I increased the amount of fat. My patients were all taken from an ambulatory service in the slums.

Tables are appended to show the gain in weight in these twenty-five cases, and I may say that I believe it is quite safe to predict that an infant, if it has the breast only once or twice in the course of twenty-four hours, will thrive on the bottle much better than on the bottle alone, and I am convinced that it is not advisable to deprive the infant of the mother's breast, no matter how scant the secretion of the breast may be. It is very difficult to decide how much cow's milk should be given such infants because it is impracticable to measure the amount of milk secreted by the breast in question. An observant mother and physician will soon find out, however, how much additional milk should be given in any case.

DR. ROTCH: While this work is very interesting I think it is not at all scientific. We cannot make a test of any method of feeding by the use of ambulatory subjects for the doctor can never tell what such children are getting when they are away from his observation.

DR. KOPLIK: I admit the force of this objection. I have not attempted to show the value of any particular mixture, but merely to determine how much weight a bottle-fed infant should be gaining if it were prospering.

DR. ROTCH: That is exactly what you have not shown and what cannot be shown by this method.

DR. MORSE: It seems to me Dr. Koplik has simply reported the gain in weight of a certain small number of infants fed on a certain mixture, and did not report the number or condition of those that did not thrive under the same circumstances, consequently the work is without scientific value.

DR. WENTWORTH: If Dr. Koplik meant to recommend any breast milk as better than artificial feeding alone I shall have to take issue with him, because I believe it is a well-known fact that careful chemical analysis has shown that when the mother's milk is scanty it is also apt to be a poor milk.

DR. CHAPIN: It seems to me, however, that clinical experience shows that it is better to give the mother's milk even though the albuminoids be high and the fats low than to cut it off entirely for substitute feeding.

DR. BLACKADER: I am rather inclined to agree with the last speaker for it is no light measure to at once put a child on artificial food.

DR. WENTWORTH: I recognize the value of mixed feeding, and I only criticised Dr. Koplik's point that even a very scanty supply of milk added to the artificial feeding is better than artificial feeding alone.

The next paper, on "Porencephalus. Case and Specimen," was presented by DR. GEORGE N. ACKER of Washington. The patient was a male colored child, four years old, in whom the mother noticed, soon after birth, that the eyes had a peculiar appearance and that he did not move his right arm or leg. He never made an attempt to walk, or talk, and was quiet at all times except when hungry, when he would emit a peculiar shrill cry. The muscles were soft and flabby, with a noticeable atrophy on the right side and the right forearm was strongly flexed and could not be extended. During his stay at the hospital there were pronounced nervous symptoms and the temperature at one time reached 107° F. At the post-mortem examination, twenty-six hours after death, it was found that the right hemisphere weighed 19½ ounces and the left 14½ ounces. The defect in development of the brain corresponded pretty closely to the parts supplied by the middle cerebral artery and seemed to be due to some change in this artery. The fissuration was quite atypical.

"A Preliminary Communication on the Separation of Bacteria from Milk by Natural Processes" was read by DR. R. G. FREEMAN of New York. He said: I have previously expressed the opinion that raw milk, even when the conditions of the dairy are satisfactory, cannot be considered safe for administration without heating because it is likely to contain a considerable number of bacteria, and we cannot make sure that among these there may not be the organisms that produce diarrhea, typhoid fever, diphtheria, or other diseases. For that reason I desire to make a preliminary report on some work which, while incomplete, seems to show that the great bulk of bacteria which contaminate milk may separate from it by natural processes without the use of filtration, heat or preservative agents. If milk is allowed to stand until the cream separates, and then if a separate analysis is made of the milk and of the cream it will be found that the cream contains 300 times as many bacteria as the milk, and with the rising of the cream about ninety-nine per cent. of the bacteria are removed from the milk. This separation may be due to the better oxygenation of the upper layers, which induces the organisms to rise to the surface, or it may be due to their being

carried up by the fat globules in their process of inverse precipitation. Should this prove to be correct we may be able to pasteurize or sterilize the separated cream and then add it again to the practically germ-free milk for administration as a food.

The next paper, entitled "Sarcoma of the Cerebellum in a Child, Aged Four Years," was read by DR. S. S. ADAMS of Washington, D. C. The patient was first taken ill in June, 1897, the prominent symptoms being high fever and vomiting. Under treatment she apparently recovered in about a week, but a month later she began to complain again of intense pain in her head and right arm. This was followed by weakness of the legs, the child frequently staggering and at times falling. She slept well at night and seemed to suffer principally in the mornings and afternoons. A second attack of fever and vomiting developed and she lost control of her bowels and bladder. At the autopsy the diagnosis of cerebellar tumor was verified. The brain weighed thirty-nine ounces.

"Enlarged Bronchial Nodes" was the title of the next paper, read by DR. J. PARK WEST of Bellaire, Ohio. He said: Within a comparatively short time I have seen eight children in whom I have made the diagnosis of enlarged bronchial nodes and in every case the patient had come on account of the accompanying cough. In every case there seemed to be a more or less general involvement of the lymphatic system. Every child had enlarged cervical nodes. In six there were, in addition, large axillary nodes, and in five large inguinal nodes. All had large tonsils, two had adenoids that interfered with nasal respiration, and in three the spleen could be felt. It seems to me that the enlargement of these nodes was the local manifestation of a status lymphaticus.

"Report of a Case of Transposition of the Viscera of the Great Vessels, with Photograph" was read by DR. J. P. CROZER GRIFFITH of Philadelphia. The patient, a boy eight months old, began three months previous to admission to the hospital to have attacks of cyanosis and dyspnea, lasting about twenty minutes and occurring as often as half a dozen times a day. On admission the child seemed ill and was distinctly cyanotic. A systolic murmur was heard with greatest intensity at the pulmonary cartilage and at the third left interspace close to the sternum, as well as at the aortic cartilage and the apex. It was not transmitted to the axilla and there was no thrill. The diagnosis of pulmonary stenosis, probably associated with a perforate septum ventriculorum was made. The child soon sickened with what appeared to be symptoms of pneumonia, cyanosis increased, and he was so weak that he was treated purely symptomatically and the actual condition of the viscera was not investigated. I have here the post-mortem specimens which show the following peculiarities. The aorta arises from the right ventricle and passing upward arches slightly from left to right, then almost directly backward, over the right bronchus, and descends upon the right half of the vertebral column. The coronary arteries arise from the right ventricle. The pulmonary artery rises from the left ventricle to the left of and slightly posterior

to the origin of the aorta. The liver lay chiefly to the left side and the spleen in the mid-axillary line in the right hypochondrium. There are two supernumerary spleens.

DR. R. G. FREEMAN of New York then read a paper, entitled "Observations on Certain Abnormal Conditions in Livers of Infants and Children." He said: I have carefully studied the autopsy reports of some 500 cases at the New York Foundling Hospital, with reference especially to the conditions of the liver. In this investigation I have found that cirrhosis of the liver is very rare in infancy, as is also the condition of waxy liver. With regard to the condition of fatty liver I have found some points that quite contradict the ordinary statements given in the text-books, and am led to formulate the following conclusions: (1) Fatty livers occur very frequently in the infants and children that come to autopsy at the Foundling Hospital—about forty-one per cent. of all cases. (2) The condition of nutrition of the child apparently has no connection with the fatty condition of the liver, the condition of nourishment in the subjects having fatty livers averaging about the same as in the whole number of cases. (3) Fatty livers occur rarely in the chronic wasting diseases, such as marasmus, malnutrition, or rachitis and syphilis, unless such condition be complicated by an acute disease. (4) With tuberculosis fatty livers do not occur more frequently than in other conditions. (5) Fatty livers occur most often with acute meningitis, gastro-intestinal disorder, measles, and diphtheria.

"A Case of Meningitis Due to the Typhoid Bacillus" was reported by DR. A. H. WENTWORTH of Boston. The patient, four years of age, first seen October 1, 1898, had always been a delicate child but had never had any previous illness. For six days prior to entrance into the hospital she had been feverish, drowsy, without appetite, and was said to have been delirious at times. On admission there was considerable apathy from which she could be aroused without difficulty although she became quite irritable. The urine contained a faint trace of albumin. Its specific gravity was 1015. The examination of the blood showed 12,000 leucocytes per cubic millimeter. A provisional diagnosis of typhoid fever was made. The next day the nurse reported that twice during the night the child's body became rigid, the hands clenched and the eyes were rolled upward, this condition lasting about one minute each time. An examination of the eyes was made, but without result, and from fluid secured by spinal puncture no growth was obtained. The following day there was bulging of the right tympanic membrane and when paracentesis was performed there was an escape of air, but no fluid. Widal's test was negative, though the clinical symptoms were those of a moderately severe typhoid fever. On October 15th a second blood count showed 9600 leucocytes. On the 16th the child became very stupid and by evening was unconscious. Tonic and clonic convulsions and Cheyne-Stokes respiration supervened. On the following day strabismus appeared, and there was general rigidity of the muscles of the trunk and extremities, with spasms at intervals. Death occurred on the seventeenth day.

Lumbar puncture was performed a few hours before death, and the spinal fluid obtained was turbid and soon showed a deposit of puriform material in the bottom of the test-tube. A careful study of this deposit by all methods showed a pure culture of the typhoid bacillus.

In considering the diagnosis I would say that in favor of typhoid fever there is the onset, the duration of the disease, the character of the temperature-charts, the enlarged spleen, the failure to obtain evidence of the presence of other diseases by means of physical examination, and the negative result of the first lumbar puncture showing the absence of meningitis at that time. As against the typhoid diagnosis there was the failure of the Widal test and the occurrence of doubtful convulsions in the early period of the disease. In favor of meningitis due to the typhoid bacillus there was the presence in the meninges of a purulent exudate which contained numerous typhoid bacilli, and the failure to detect the presence of other organisms by means of most careful bacteriologic examinations.

"Vaccinoid" was the title of the next paper, read by DR. F. FORCHHEIMER of Cincinnati. He said: The subject of this paper is the peculiar manifestations of vaccinia, which have usually been denominated false or spurious vaccinia. Recently the French investigators have done much work to show the relation of these conditions to vaccinia. According to their classification by vaccinoid is meant an atypical course of the lesions produced by the act of vaccination, and in their external manifestations they have the same relation to vaccinia that varioloid has to variola. The speaker reported a number of cases observed in his own practice with a careful study of the subject and offered the following conclusions: (1) Vaccinoid is always modified vaccinia. (2) Vaccinoid protects against variola. (3) This protection is less than that of vaccination. (4) Vaccinoid in the majority of instances is due to faulty method, rarely to increased resistance or immunity. (5) In primary vaccinations vaccinoid should always be followed by repeated attempts until either true vaccinia is produced, or until positive evidences of immunity exist. (6) In the presence of an epidemic of variola vaccinoid should be followed by revaccination, both in primary vaccinations as well as in revaccination. The more thoroughly vaccination is performed the fewer will be the cases of vaccinoid, provided the virus is perfect. Vaccinoid is an abortive vaccinia, and abortive vaccinia is not perfect vaccination.

"Acute Articular Rheumatism in Infants under One Year of Age, with Report of a Case," was read by DR. D. J. MILTON MILLER of Philadelphia. He said that from an extensive review of the literature upon this subject it seems that acute articular rheumatism in infants is very rare. A number of cases have been reported as such which would not bear the test of the essential features of the disease as seen in adults. The patient that he had observed is an infant nine months old with an attack of genuine acute polyarticular rheumatism. In the diagnosis of such a rare condition every other possible cause for the joint affection must be excluded before we can assert that a given case is rheumatic. The points

necessary to be established in making such a diagnosis are: mobility, proneness to migrate from joint to joint, absence of all tendency to suppuration, frequency of inflammation of the cardiac serous membranes, the favorable influence of the salicylates, and a family history, together with the absence of such affections as are apt to be attended by inflammation of the joints. According to this test only nineteen undoubted instances of acute articular rheumatism occurring in infants under one year were found in the literature.

The next paper, entitled "Urticaria of Mucous Membranes," was read by DR. F. A. PACKARD of Philadelphia. He said: This paper is written to suggest the possible frequency of the condition of internal urticaria as an explanation of certain cases otherwise difficult to understand, such as the so-called "stomach cough" and "sore throat of indigestion." I have seen two cases of urticaria associated with asthma or bronchitis, and with the cases reported in the literature these make thirty-four in which the connection between the skin-lesion and the respiratory symptoms was quite close. The order of the occurrence is not uniform, and while in many cases there seems to be a balance between the cutaneous and respiratory lesions the two systems are frequently involved at the same time.

"The Renal Complications of the Acute Enteric Diseases of Infancy" was the title of a paper read by DR. JOHN L. MORSE of Boston. The essayist said in part: During the Summer of 1898 I examined the urine of seventy infants ill with uncomplicated diarrheal diseases. They were all out-patients at the Infants' Hospital and hence many could not be examined more than once. All were under two years of age, forty-seven being under one year. The urine was obtained by catheterization, scrupulous care being taken as to cleanliness of the catheter. Tables showing the extent of the investigation and the results of the examinations are appended. I believe it probable that more- or less-marked degenerative changes occur in the kidneys in many, if not most, patients. These degenerative changes are due to the action of bacteria or toxins, usually the latter. Inflammatory changes are rare. Albuminuria occurs in about fifteen per cent. of all cases and casts are found in sixty per cent. of these. The presence of albumin and casts does not justify the term "nephritis," and is not of bad prognostic import.

DR. FLOYD M. CRANDALL of New York then read a report of "A Case of Scurvy in an Infant Six Weeks Old." The patient was born October 12, 1898. The father was not in good health, having long suffered from chronic rheumatism, while the mother, who had a valvular cardiac disease, following rheumatism, was anemic and did not recover from the effects of confinement for many weeks. The child was not strong and when seen in the sixth week there was a well-marked condition of scurvy. The child had never taken anything but breast-milk, which was very abundant, though thin and watery. So abundant was the supply that though the child nursed frequently it never emptied the breast and consequently only received "fore-milk," which contains a much smaller amount of fat than does the later milk. The child

was allowed to continue nursing, but pasteurized cream was given to make up the proper amount of fat, and the results were prompt and satisfactory so far as the scurvy was concerned, but the child subsequently died from an attack of pneumonia.

DR. GRIFFITH: In a recent text-book I find the statement, in italics, that in scurvy occurring before the stage of eruption of the teeth there is no characteristic lesion on the gums. In the collective investigation made by this society last year twenty-four such cases were reported. Of course the society did not assume the responsibility for all of these, but I feel that certainly all the reporters could not have been wrong.

"Congenital Cystic Kidneys, with Report of a Case" was read by DR. E. E. GRAHAM of Philadelphia. He said: I was called to see this baby about twenty minutes after its birth. It was well developed but distinctly cyanotic, breathing feebly, and the cyanosis appeared to be more marked than the heart's action and feeble breathing should produce. The body was limp and the child could not be aroused. Death occurred forty-five minutes after birth. The autopsy made four hours later showed a normal heart, small areas of lung tissue containing air; liver, spleen, and mesenteric glands normal, and both kidneys cystic.

"A Case of Multiple Osteomyelitis in an Infant" was reported by DR. T. M. ROTCH of Boston. The patient was a female infant, one month old, with a history of a previous erysipelas starting from the umbilicus and running down on the left leg. At the time seen the diagnosis of cellulitis and probable osteomyelitis was made. An incision was made along the inner side of the tibia and an abscess found under the periosteum. A second abscess appeared at the posterior border of the deltoid. Cultures taken from both these abscesses showed the staphylococcus aureus. The infant died nine days later and autopsy showed a multiple osteomyelitis.

The following officers were elected for the ensuing year: President, Dr. Henry Koplik of New York; secretary Dr. Samuel S. Adams of Washington; treasurer, Dr. J. Park West of Bellaire, Ohio.

THE INDIANA STATE MEDICAL SOCIETY.

*Abstract of the Proceedings of the Annual Meeting,
Held at Indianapolis, Ind., June 6 and 7, 1899.*

THE annual meeting of the Indiana State Medical Society held at Indianapolis has been a great success. The attendance and *esprit de corps* partook of the general activity of the community and inclination to hustle observable everywhere. Excellent papers were read and vigorously discussed, one or two of which deserve especial circulation, as, for instance: "Diphtheria and Antitoxin," by DR. A. E. POWELL of Marion, who reported an outbreak of the disease in the orphanage of his county. In substance he related that on January 15, 1899, a case of throat trouble developed in a female inmate, which was diagnosed as tonsillitis. There were sixty-eight children of all ages and both sexes in the institution at that time. Within the two weeks following twenty-five cases of sore

throat occurred and in several of them microscopical examination revealed the specific bacillus of diphtheria. The early cases progressed favorably and it was not thought necessary to use antitoxin. Gradually, however, the severity of attacks increasing, its use was begun in the case of a girl, aged six years, who developed severe pharyngeal diphtheria. As she improved in the beginning under the treatment the local manifestations disappeared, but later she succumbed to paralysis of the heart.

The second patient received 1000 units as an initial dose. This amount was repeated in twenty-four hours and the child recovered, although his heart was very weak. Three other children developed the disease in quick succession and were treated with like results, when it was determined to give an immunizing dose of the antitoxin to all of those remaining unaffected. Accordingly, to each of thirty-eight children, 500 units was administered. There were no skin eruptions in any case and no abscesses formed. None of those injected for immunization developed the disease.

This experience led the speaker to the following conclusions:

1. When in doubt about a case of sore throat it is safest to call it diphtheria and treat it as such in every respect.
2. Antitoxin is the most reliable remedy we have today in the treatment of diphtheria.
3. Antitoxin proves itself most valuable when administered early in the course of the disease and in sufficient quantity.
4. Antitoxin is a positive preventive of diphtheria when administered to those who have been exposed to the disease.

In striking contrast to this paper was that by DR. T. J. GRIFFITHS of Crawfordsville, who selected the subject of "Hydrotherapy in the Treatment of Diphtheria." He took occasion to rap the antitoxin treatment, along with most others that have preceded it, characterizing them as being in many instances blind, cruel, and irrational. After calling attention to the rapidity of proliferation in childhood and the conditions necessary for the rapid development of germs either in or out of the body, *vis.*, heat, moisture, and fertile soil, he proceeded by noting the fact that ice applied to the throat lowers the temperature of the part below that at which germs can thrive and grow. Ice, he said, is as certainly a specific for diphtheria as is quinin for malarial poison; no glandular engorgement or serous effusion ever takes place in the presence of the cold produced by the application of ice. Under this treatment no septic swabbing with any preparation of iron becomes necessary; no septic poisoning ever can or will take place in its presence; it is grateful, soothing, invigorating to the patient, and hastens convalescence without exhaustion. The same treatment is applicable in scarlet fever and in croup; no remedy is equal to it in certainty and rapidity of action. He has seen a child with that never-to-be-forgotten whistling respiration, cyanotic from deficient aeration relieved in a few minutes by the application of a snow-poultice. Cold

is non-toxic, is a tonic, germicide, and febrifuge, and is easily procurable and regulatable by the physician. He cited Pepper and May as authorities on the question of therapeutics of cold.

"The Clinical Features of Malaria as Seen at Camp Mount," by DR. W. T. S. DODDS of Indianapolis, held the close attention of the assembly on account of the peculiarities manifested in the persons of the recently returned troops from Cuba and Puerto Rico. The speaker said that in these subjects malaria does not present itself in its characteristic forms; the surroundings and environment have much to do in modifying the character which malarial manifestations assume. If the person infected be robust and healthy previously the greater the liability to a typical course of malarial fever. On the other hand, if he be anemic, and especially if he has had previous attacks, the course of the disease may deviate widely from the ordinary and typical form; he may or may not have febrile disturbance; if fever be present it is likely to be of low degree and assume the typhoid form. Lawrence places the febrile activity centers in the brain and assumes that as the malarial process progresses these centers become less and less sensitive to the presence of the parasite.

The temperature ranges about 99° F. and the subject presents a picture of tuberculous infection, often grows worse and finally presents symptoms both grave and obscure. Slight splenic engorgement, in addition to the emaciation, is about all a physical examination will reveal. The emaciation and irritability are progressive. Marked stomach and intestinal complications may intervene and the subject succumb to a fatal dysentery. While those who live in malarial districts may finally become immune so long as they remain in the same locality, if they change about they acquire as great a liability to disturbance as originally existed. The apathetic condition of the patient, the coated tongue, the pain in the head, back, and loins, and the enlarged spleen, in connection with epistaxis, closely resembles typhoid fever. In the congestive form the physical appearance does not correspond to the intensity of the trouble; the pulse is slow, the rhythm disturbed, and valvular murmurs are often audible; the patient is listless, pale, and exhausted; the extremities are cold and irresponsive to local heat or other applications and the case is alarming.

That typhoid fever may be complicated by malaria, and *vice versa*, is an accepted fact; the two diseases may be associated together and their symptoms, each distinctive, be plainly indicated by the clinical features of each. Other complications, such as pneumonia, enteritis, and acute rheumatism, may occur.

The treatment may appropriately be divided into 3 classes: (1) Complete rest; (2) specific medication; (3) treatment of complications. In the chronic form a pill containing strychnin, iron, and arsenic forms a good adjuvant to hydrochlorate of quinin, which should be followed by tonics, careful diet, and exercise in the open air.

"The Hematozoon of Malaria" formed a fitting subject to follow the foregoing paper, and its microscopical ap-

pearances were fully described by DR. THEODORE POTTER of Indianapolis.

DR. F. B. THOMPSON of La Fayette presented a paper on "Leucemia." He said that the disease is characterized by the persistent and rapid increase of the proportionate number of white blood-corpuscles, together with enlargement of the spleen and the lymphatic glands. It is uncommon among children; men are more liable to it than women, in the proportion of two to one. While heredity does seem to exert a great influence upon its occurrence, still there seems to be a condition of temperament or cachexia which is an important factor, especially so in some families. In all well-marked cases the skin presents the pale, waxy appearance of decided anemia; occasionally the tendency to exuberant deposit of pigment is well marked, giving the bronzed appearance of Addison's disease. With emaciation well marked the extremities may be edematous, or general anasarca or ascites may be present. Not known to be due to specific toxic elements the symptoms are those of an indolent septicemia. Insidious in its beginning the opportunity to examine the blood is not generally presented until the disease is well established. The chief element found to exist on examination of the blood is in the superabundance of myelocytes derived from the bone-marrow. Assuming the possibility of suppuration of the blood it is not difficult to understand why the leucocytes of the blood are so enormously increased. The post-mortem appearances of the spleen, lymphatic glands, liver, and kidneys are explained when regarded as concerned in the filtration of fluids and elimination of effete and toxic substances.

In its treatment arsenic stands almost alone, doubtless on account of its ability to check putrefaction and tissue metamorphosis. Quinin in large doses has been employed, but when long continued, 3 grains, four times a day will accomplish all that can be reasonably expected of it as a remedy. Oil of eucalyptus, which has been so highly recommended, the speaker has found of little service. It would appear to be essentially a septic disease and dependent upon a toxic agent for its causation. Primarily a disease of the blood, the glandular involvement occurs as a natural consequence.

DR. L. J. WILLIEN then read a paper on "Thyosanamin as a Resolvent for Scar-structure, Rendering It Pliable No Matter Where Situated." Derived as an extract from the oil of mustard by the addition of three or four times its weight of ammonia it forms colorless rhombic crystals having a garlic odor and very bitter taste. It produces both diuresis and diaphoresis in doses of from 4 to 8 grains, three or four times a week. It should not be administered oftener than once daily. It has been injected in doses as high as 2 drams into carcinomatous tumors without any stomach distress and without appreciable good effect upon the malignant growth. It has been recommended in cases of keloid, lupus, enlarged and tubercular lymphatic glands of the neck, sarcoma, fibroids, and syphilis. Its effects in cases of syphilis were manifested in the following case: J. G., aged fifty-six years, of good family history, given to the free use of

alcoholic stimulants, contracted some years ago a specific disease. Height 6 feet, weight 200 pounds, in 1896. He complained of vertigo, double vision, dizziness, and tendency to fall forward when walking. Numbness of the tongue and aphasia coexisted. The left side of the body became weak and was followed by cephalgia. Placed under a strong course of iodids and mercurials without any satisfactory results he repaired to the Hot Springs, returning in six weeks without any beneficial results. He consulted two prominent physicians in St. Louis and then went to Chicago for the same purpose. All agreed that he had a cerebral tumor. Confusion of ideas and impaired memory, diplopia, divergent strabismus, dilated pupils, vascular sclerotics, aphasia, numbness of the tongue, dysphagia, loss of strength and mobility of the left arm and leg, and persistent pain in the occipital region extending to the eyes and preventing sleep were marked at this time. He was given 15 minims of a 15-per-cent. solution of thyosanamin in equal parts of water and alcohol, hypodermically, three times a week. Four months having elapsed he is to-day regarded as a well man and able to attend to his business. Other cases of the same character, treated in the same manner, showing equal improvement, were reported. The good effects of the drug have been manifested even in cases of tuberculosis.

REVIEWS.

LEGAL DECISIONS, MEDICAL. By W. A. PURINGTON, of the New York Bar. Counsel of the New York State Dental Society; Lecturer on Medical and Dental Jurisprudence in the New York College of Dentistry, etc. New York: E. B. Treat and Co., 1899.

THIS is a booklet of 105 pages, most of which is devoted to the citation of decisions in 131 cases at law, involving suits by, or against, physicians and dentists. These citations are from advance sheets of the *International Medical Annual*. The decisions are interesting to peruse but their compilation is of more value to lawyers than to physicians. The work contains a brief introductory article on the justification of State Examining Boards and medical laws and the means of enforcing these laws. To these are added "A Brief for the Prosecution of Unlicensed Practitioners," and a reprint from the *New York Medical Record*, of the author's article on "Manslaughter, Christian Science, and the Law."

CHEMISTRY: GENERAL, MEDICAL, AND PHARMACEUTICAL. Including the Chemistry of the United States Pharmacopoeia. A manual of the Science of Chemistry, and its applications in Medicine and Surgery. By JOHN ATTFIELD, F.R.S. Sixteenth edition. Philadelphia and New York: Lea Brothers & Co., 1899.

AGAIN we find a new edition of this most comprehensive manual, the fifth edition to appear within the short space of ten years. It is hardly necessary to mention that all the newest discoveries and theories are embodied

in this edition, and that the book presents the science of chemistry in a most lucid manner to the medical student and practitioner. Toxicology, general chemistry, analysis of physiological as well as of other materials are discussed, and the book presents a most complete treatise on this vast subject. It is a work fit as well for the student as for those in search of a good reference book.

It is most gratifying to notice that the metric system has been given the attention it merits. A complete index occupying sixty-three pages and embracing over ten thousand references greatly enhances the value of the book. Eighty-eight illustrations serve to explain the carefully compiled text. The author is thoroughly *au courant* in all the details of interest and embodies in his text all of the latest developments of chemical principles and the latest applications of chemistry to medicine and pharmacy.

THERAPEUTIC HINTS.

For Irritating Cough of Phthisis.—When not accompanied by much expectoration the following mixture is recommended:

℞ Codeinæ	gr. iv
Ac. hydrochlor. dil.	3 ss
Spts. chloroformi	3 iss
Syr. limonis	i
Aq. dest.	q.s.ad. 3 iv.

M. Ft. emulsio. Sig. One teaspoonful at short intervals when cough is troublesome.—*Murrell*.

For Catarrhal Affections Following Measles and Whooping-Cough.—HOCK advises the employment of creosote, prescribing as follows:

℞ Creosoti	m. xv
Saccharini	gr. ¼
Ol. morrhuae	3 iii.

M. Ft. emulsio. Sig. From 2 teaspoonfuls to 3 tablespoonfuls a day.

An Analgesic Lotion.—

℞ Atropinæ sulphat.	gr. ii
Morphinæ sulphat.	gr. x
Ac. oleici pur.	3 i.

M. Sig. For inunction at painful spot. Cover with cotton and rubber tissue.

Preservation of Solutions of Cocain.—JONAS of Brussels has experimented with solutions of cocain in distilled water, with and without the addition of various preservative agents, such as boric acid, glycerin, carbolic acid, etc., in different strengths. He finds the following solutions to remain permanently clear and unchanged:

1. Cocain hydrochlor. gr. iv
Ac. carbolic cryst. gr. ½
Aq. dest. 3 iiss.
M.
2. Cocain hydrochlor. gr. iv
Ac. salicylici gr. ½
Aq. dest. 3 iiss.